UTAH DAQ 2011-2012

PM2.5 Workgroup

Why we are here

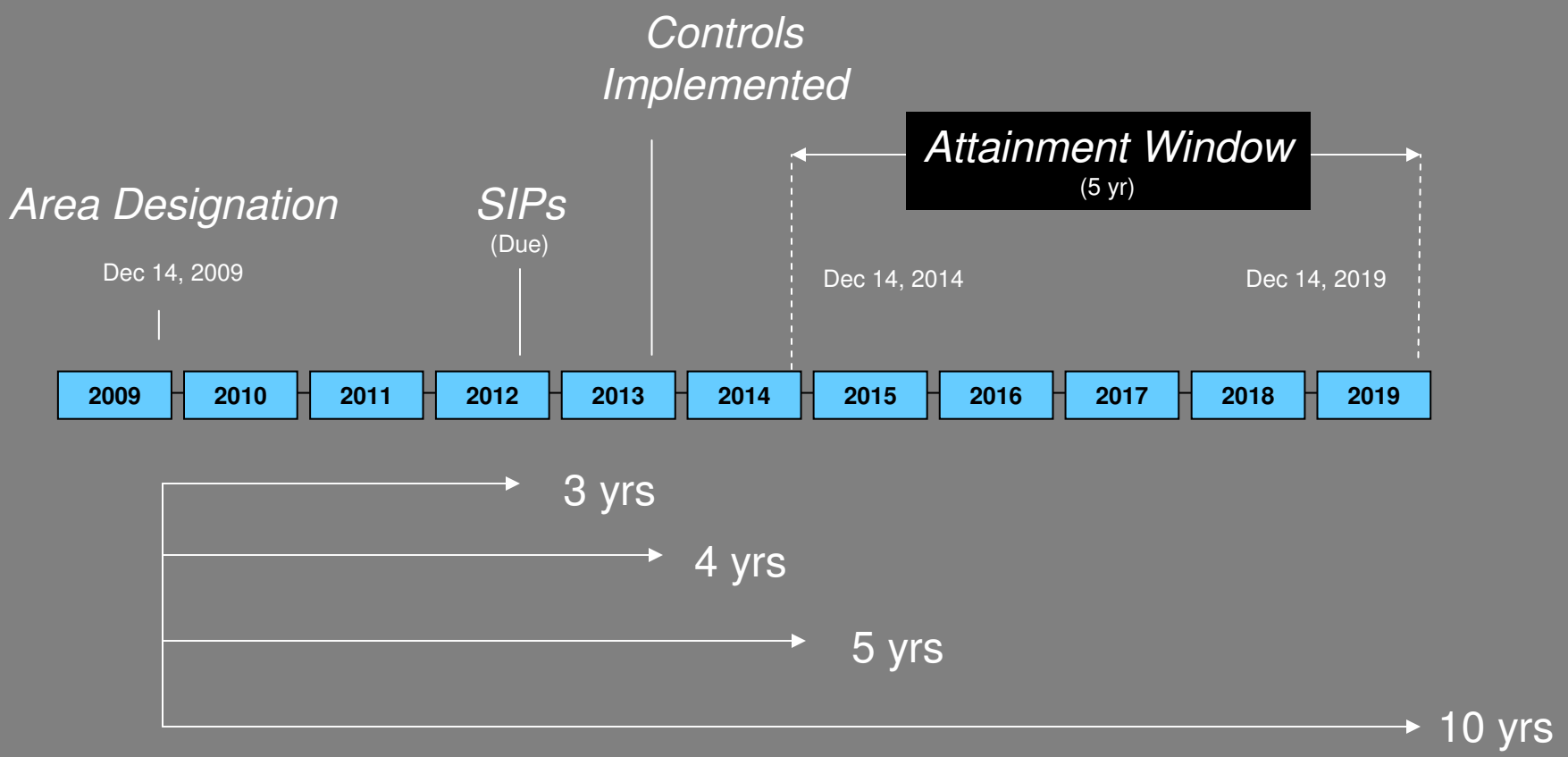
- Public Health
  - DAQ has a mandate to do what's right for public health.
- Develop an Approvable SIP
  - DAQ and the State need a SIP that works. The agency has successfully developed the technical basis for an approvable PM2.5 SIP, and EPA is its close partner in achieving the approval.
- Partnerships and Education are Critical
  - To achieve a successful outcome, many parties will have to come together. The SIP development process will therefore be inclusive and transparent.
- The Process will be VERY Difficult!
  - Everyone has to be on board to get the best outcome.

Public Involvement Process

- Consultant to manage process
  - Ensures transparency and neutrality
  - Assists in providing clear picture of DAQ/WG/Public roles
  - Assists WG in constituent involvement
- Purpose and Schedule of Meetings
  - WG 1 (Aug-Sep):Introduce Team and Process, Train for Roles, Discuss Strategy Menus/Feasibility, Assignments
  - WG 2 (October):Consult on Control Strategies, Rank and Prioritize
  - WG 3 (January 2012): Build Consensus on Control Strategies Following Modeling and Analysis
  - Public Presentation (April 2012): Gain Public Support and Identify Final Tasks
- Public Comment Program
  - All constituents and interested parties can comment at any time by visiting www.govcomments.com and clicking the project link.


Utah
Department of Environmental Quality
Division of
Air Quality

Attainment Dates

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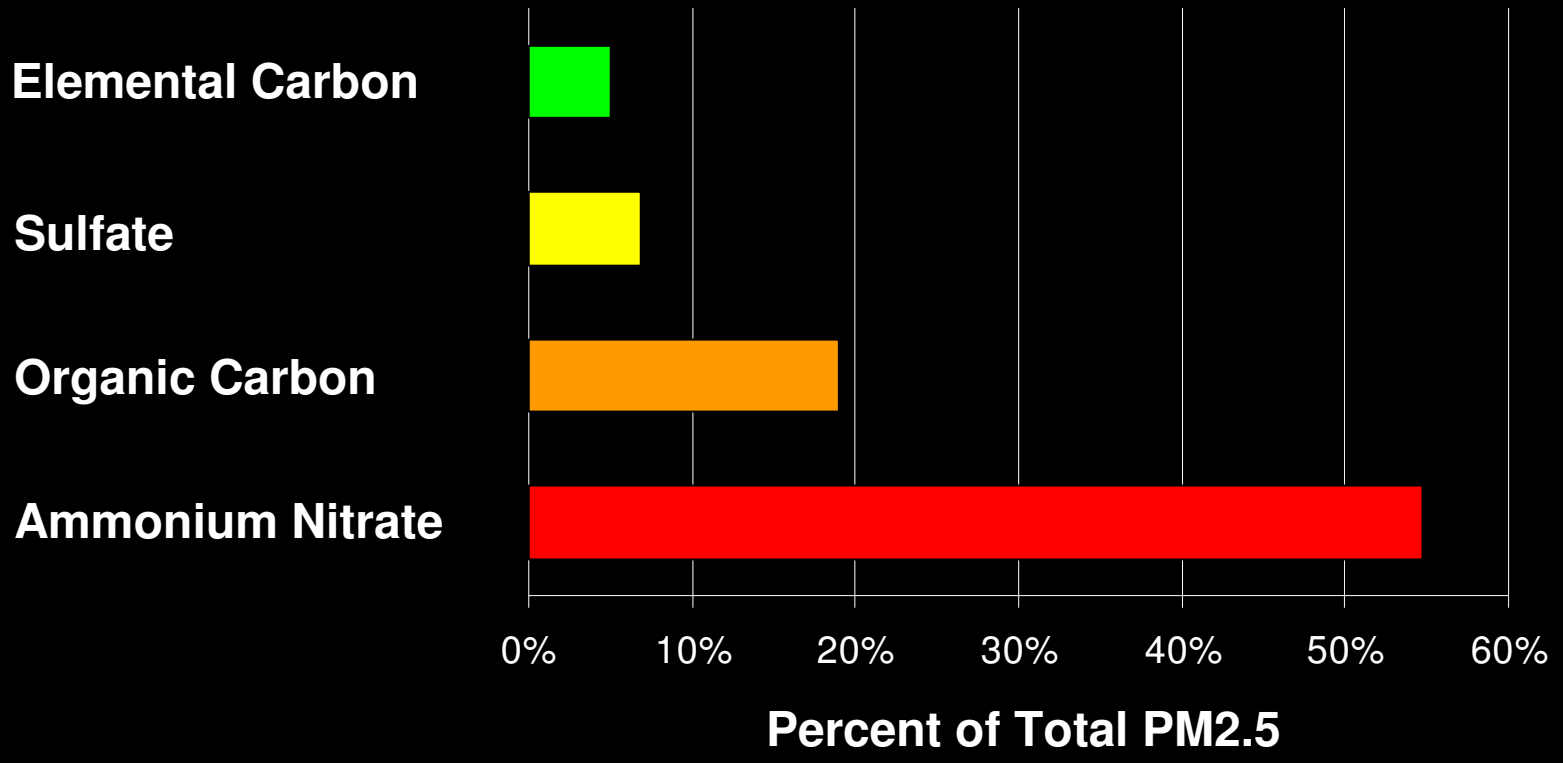
Division of
Air Quality

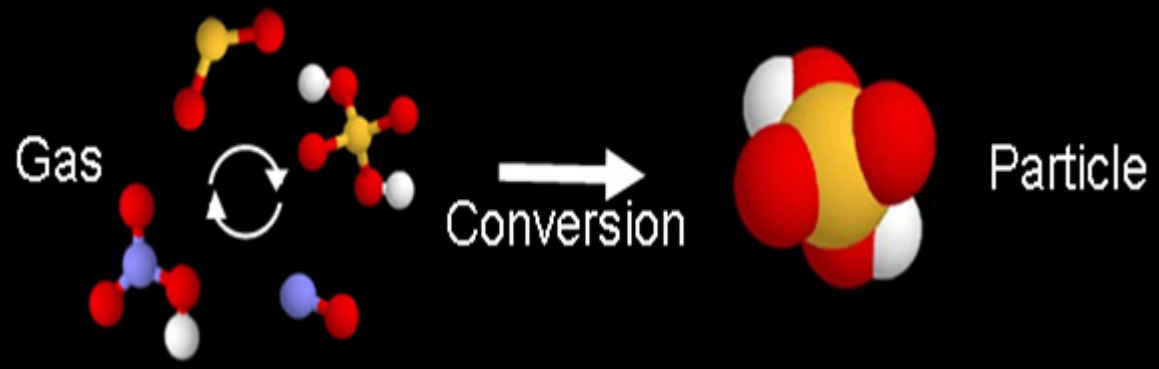
What Does the Model Show?

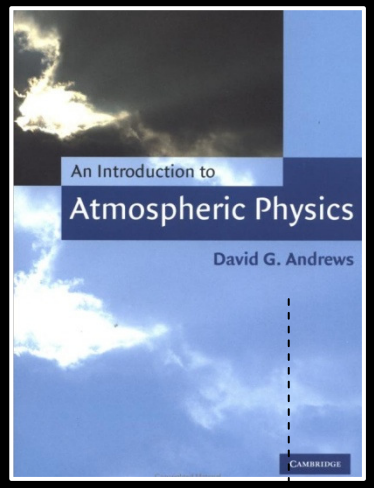
Tyler Cruickshank
Utah Division of Air Quality

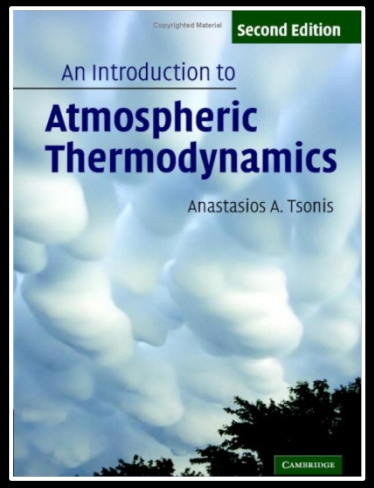
What We Breathe

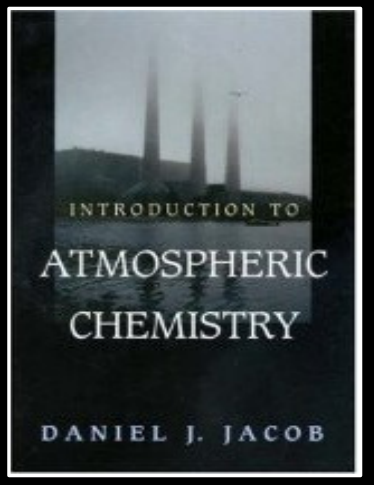


PM2.5 Creation

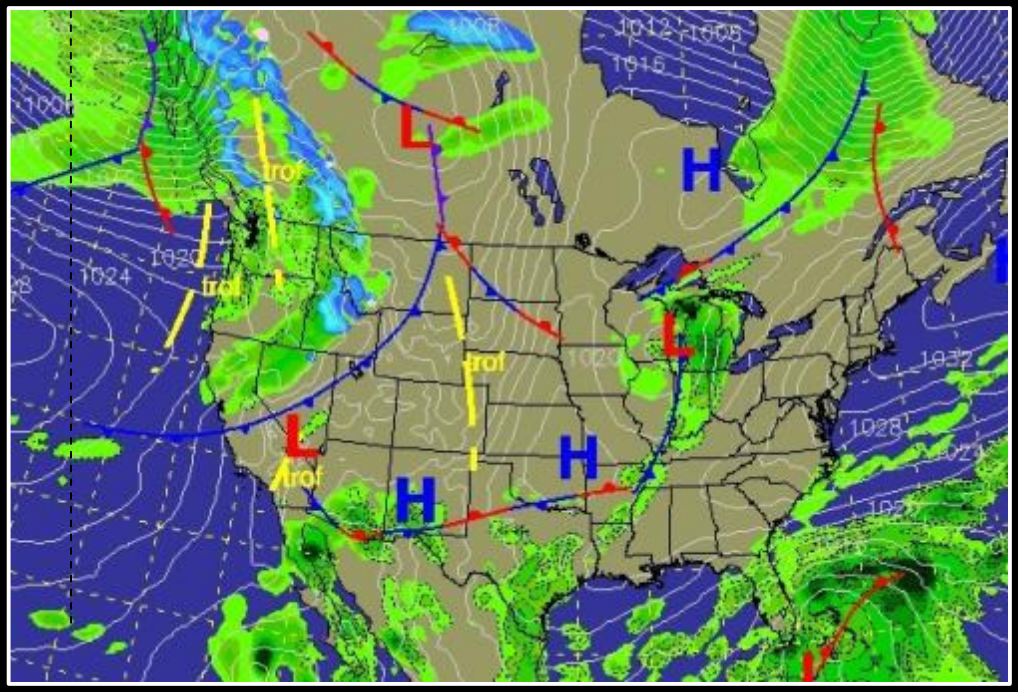




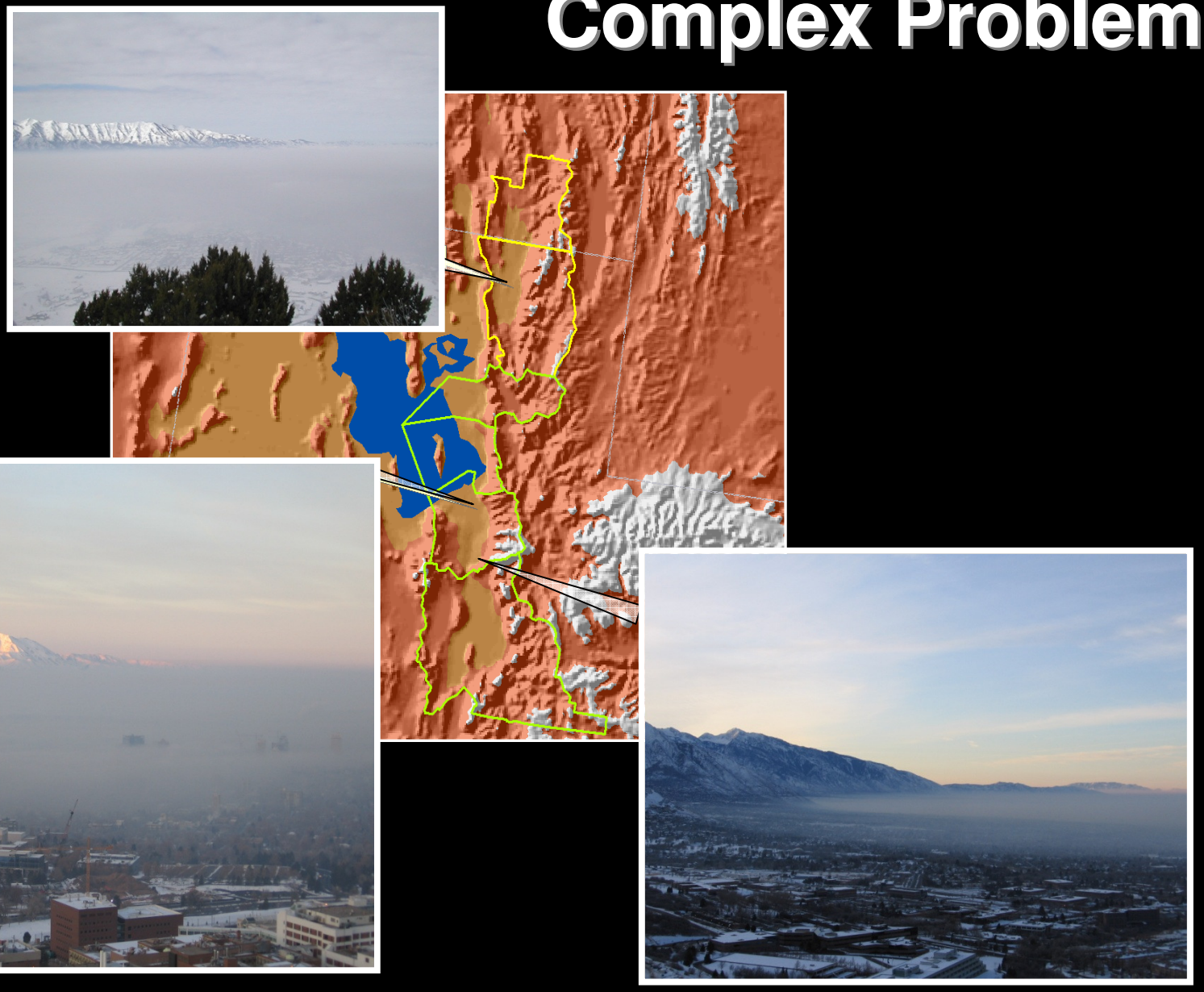




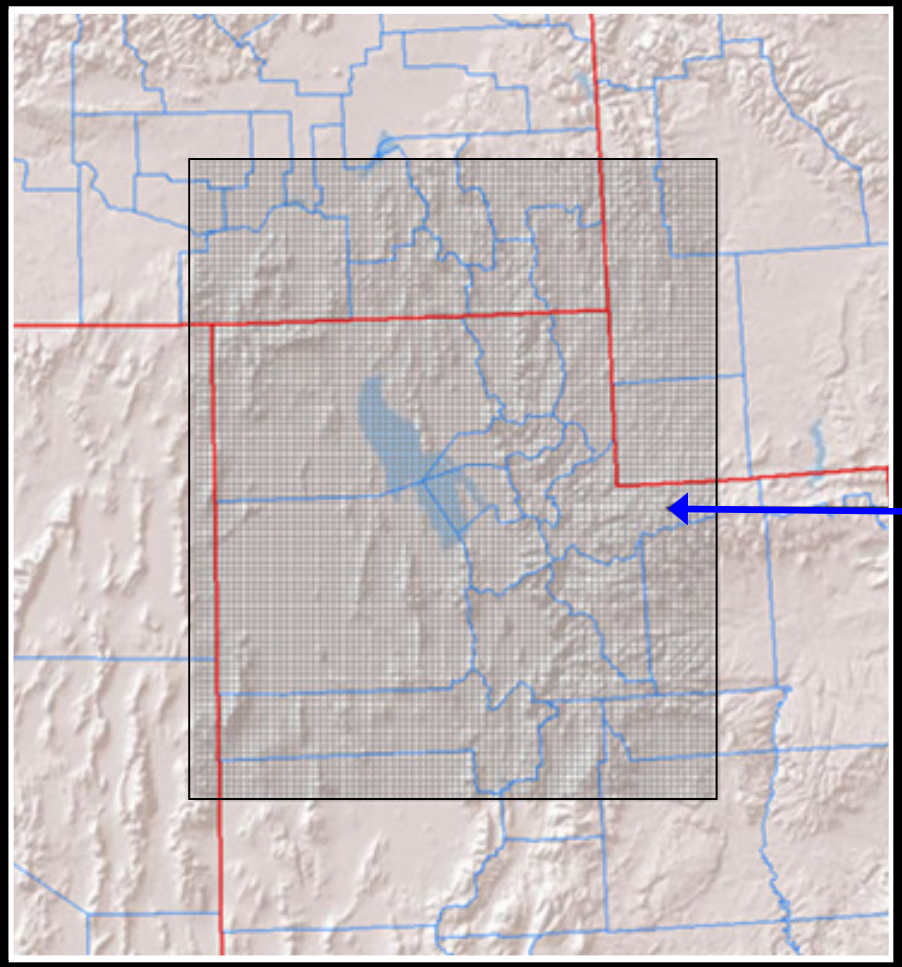
Theoretical **to the** **Practical**

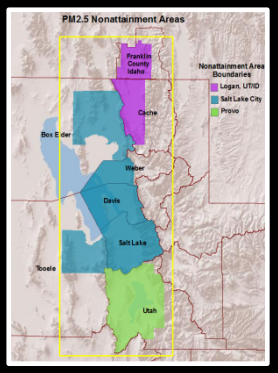


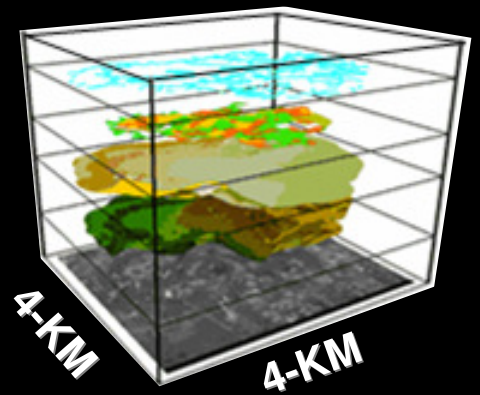
Complex Terrain ... Complex Problem



Where are we modeling?

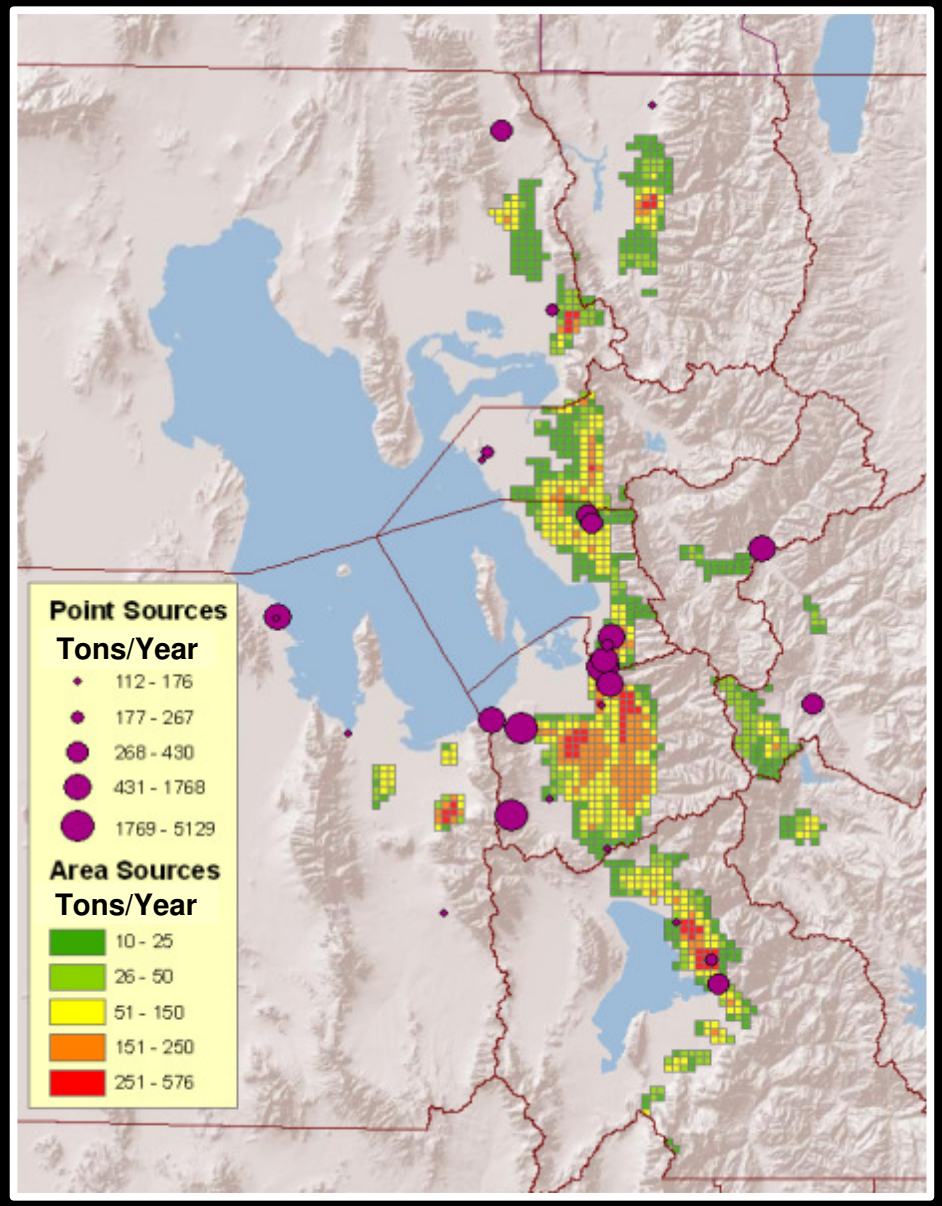






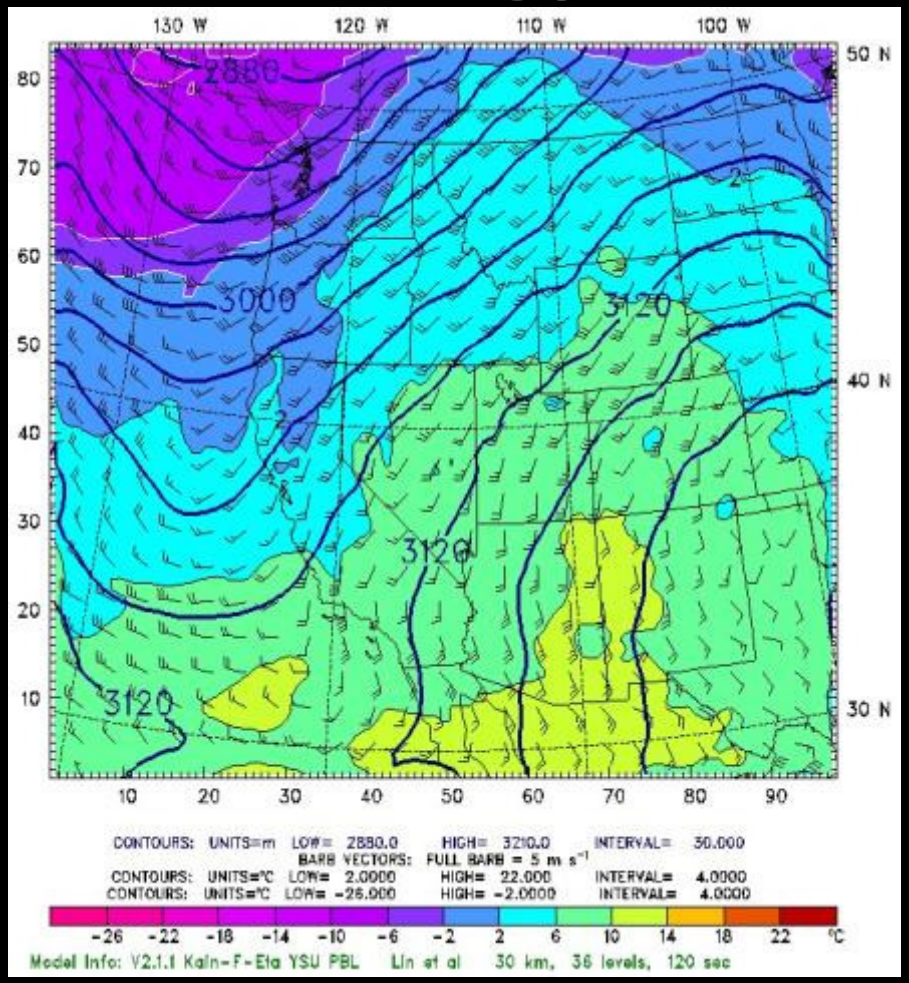
3-Dimensional Grid

Emissions


Point Sources
Tons/Year
112 - 176
177 - 267
268 - 430
431 - 1768
1769 - 5129
Area Sources
Tons/Year
10 - 25
26 - 50
51 - 150
151 - 250
251 - 576

Reducing Uncertainties

Meteorology

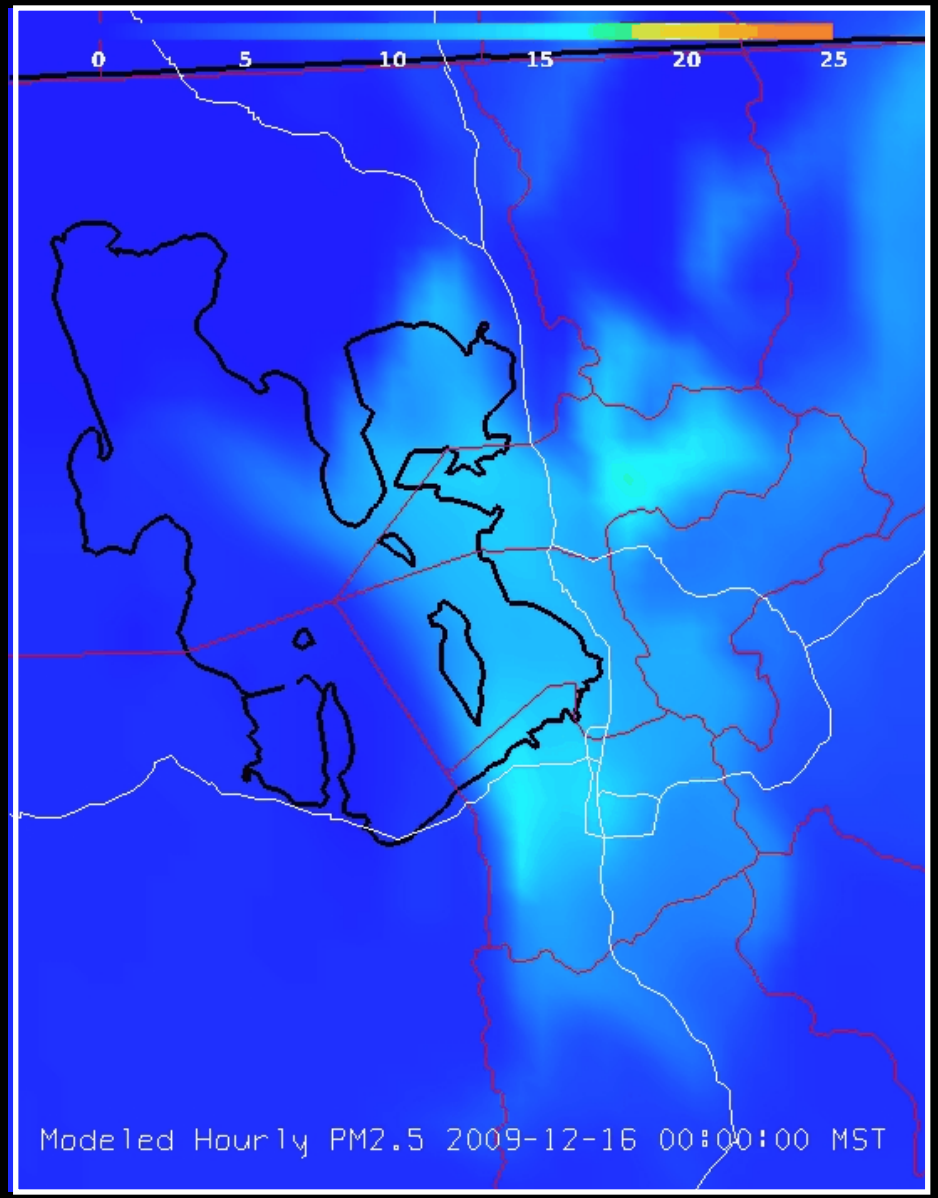


NCAR
NATIONAL CENTER FOR ATMOSPHERIC RESEARCH

DUGWAY
PROVING GROUND
UTAH, USA

ORD

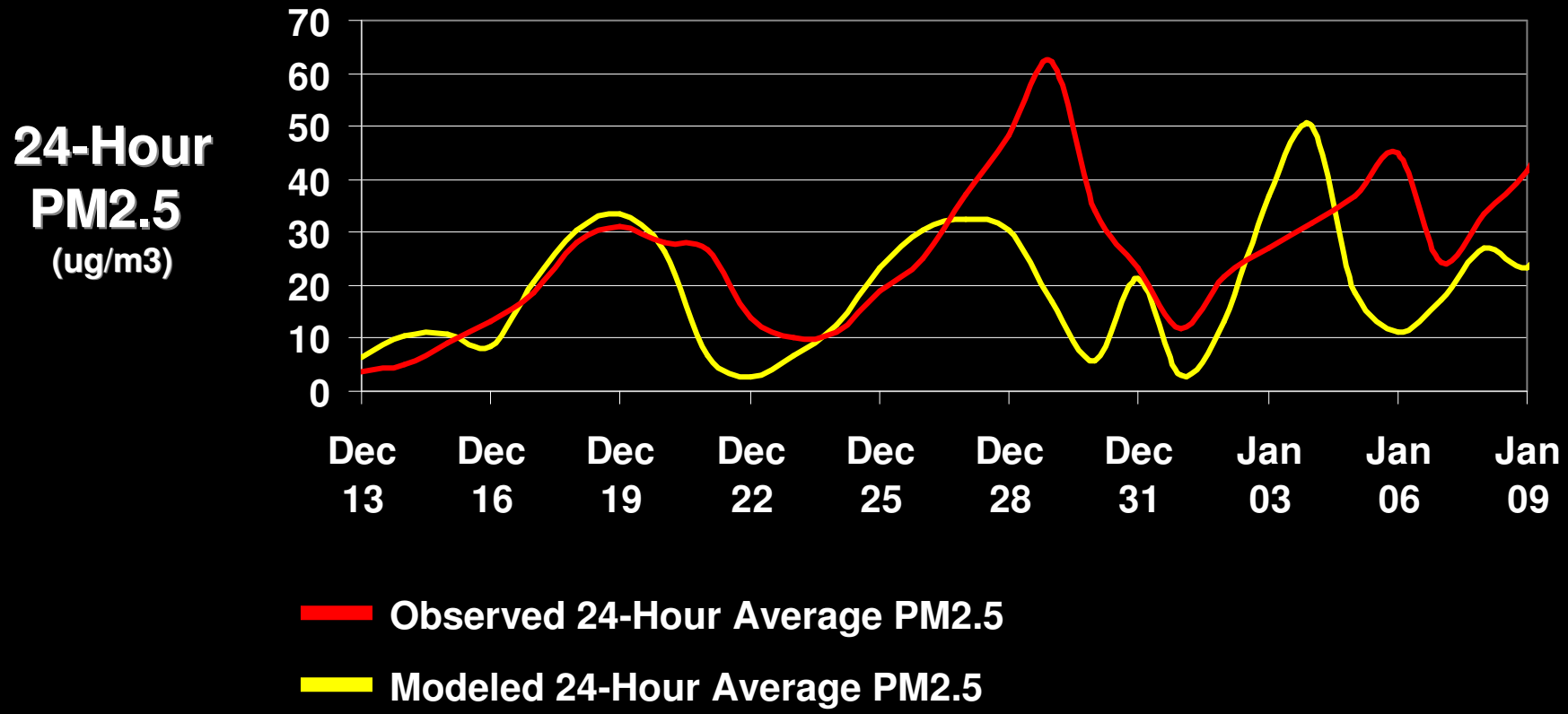
Chemistry - $PM_{2.5}$

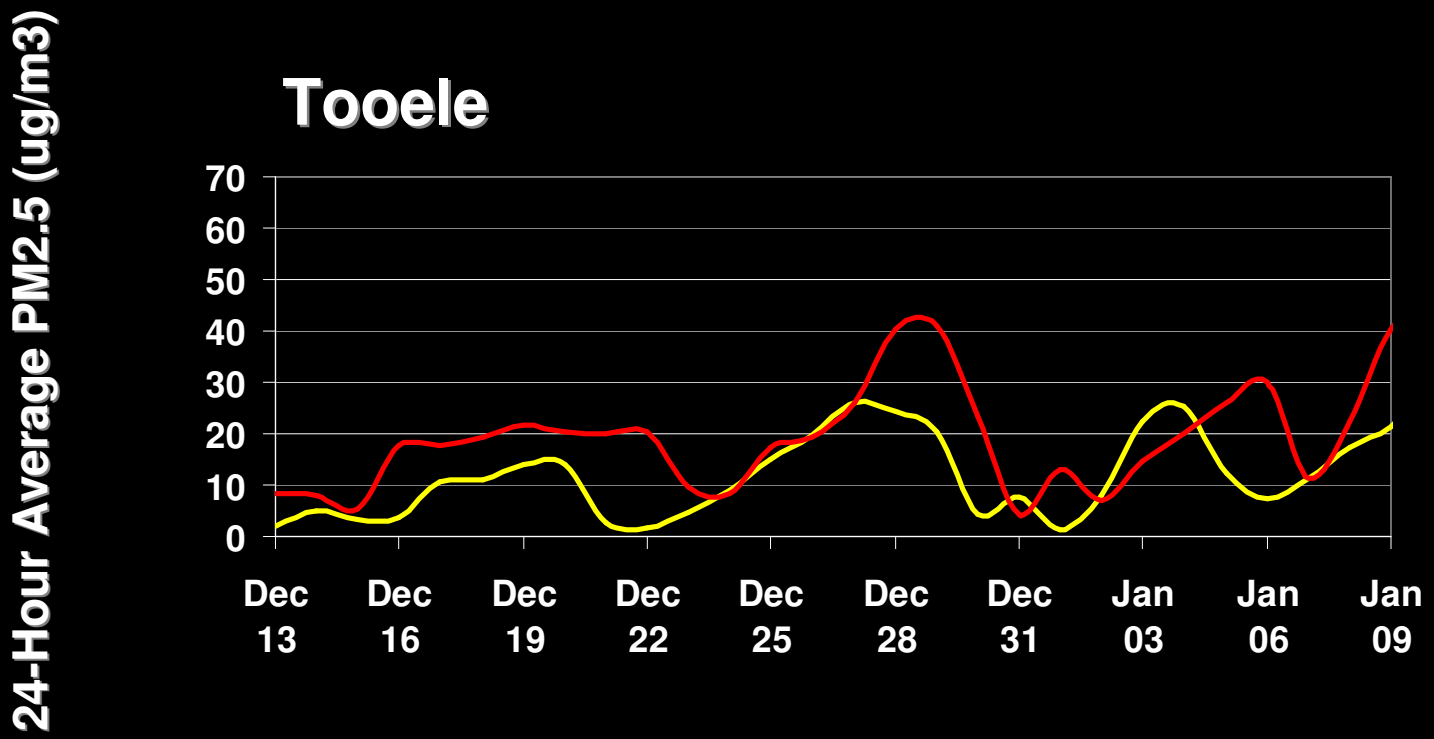


CMAQ Model

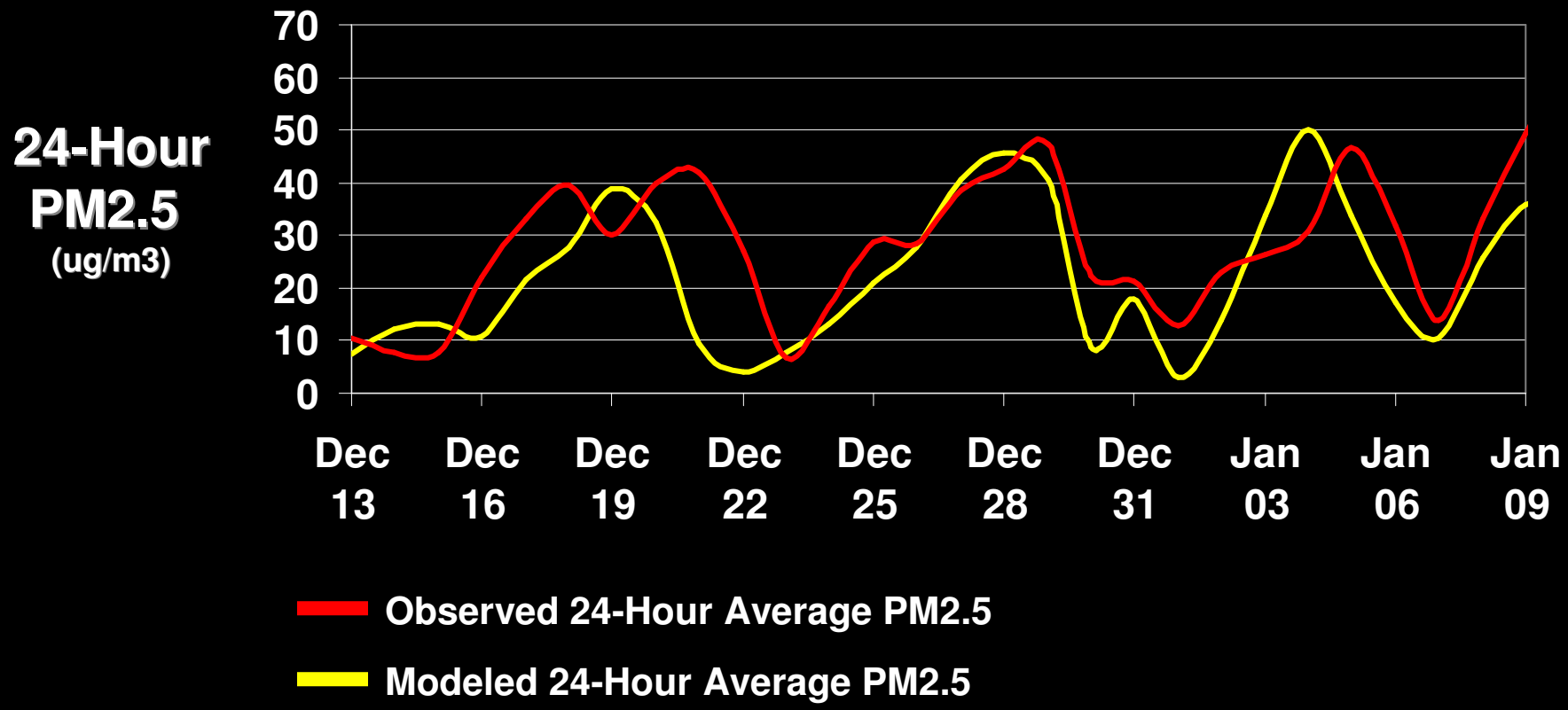
NOAA-EPA Partnership

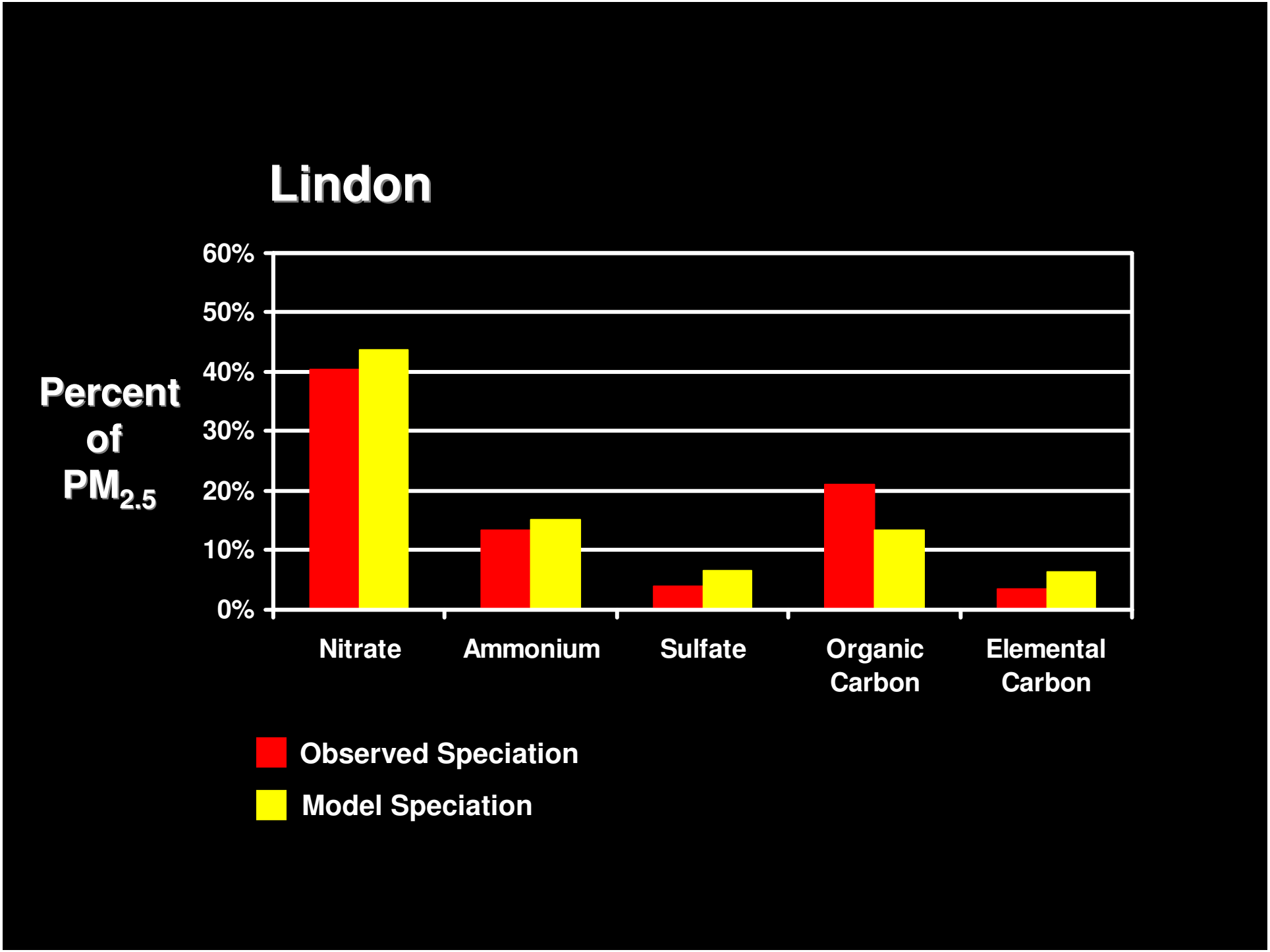
Lindon

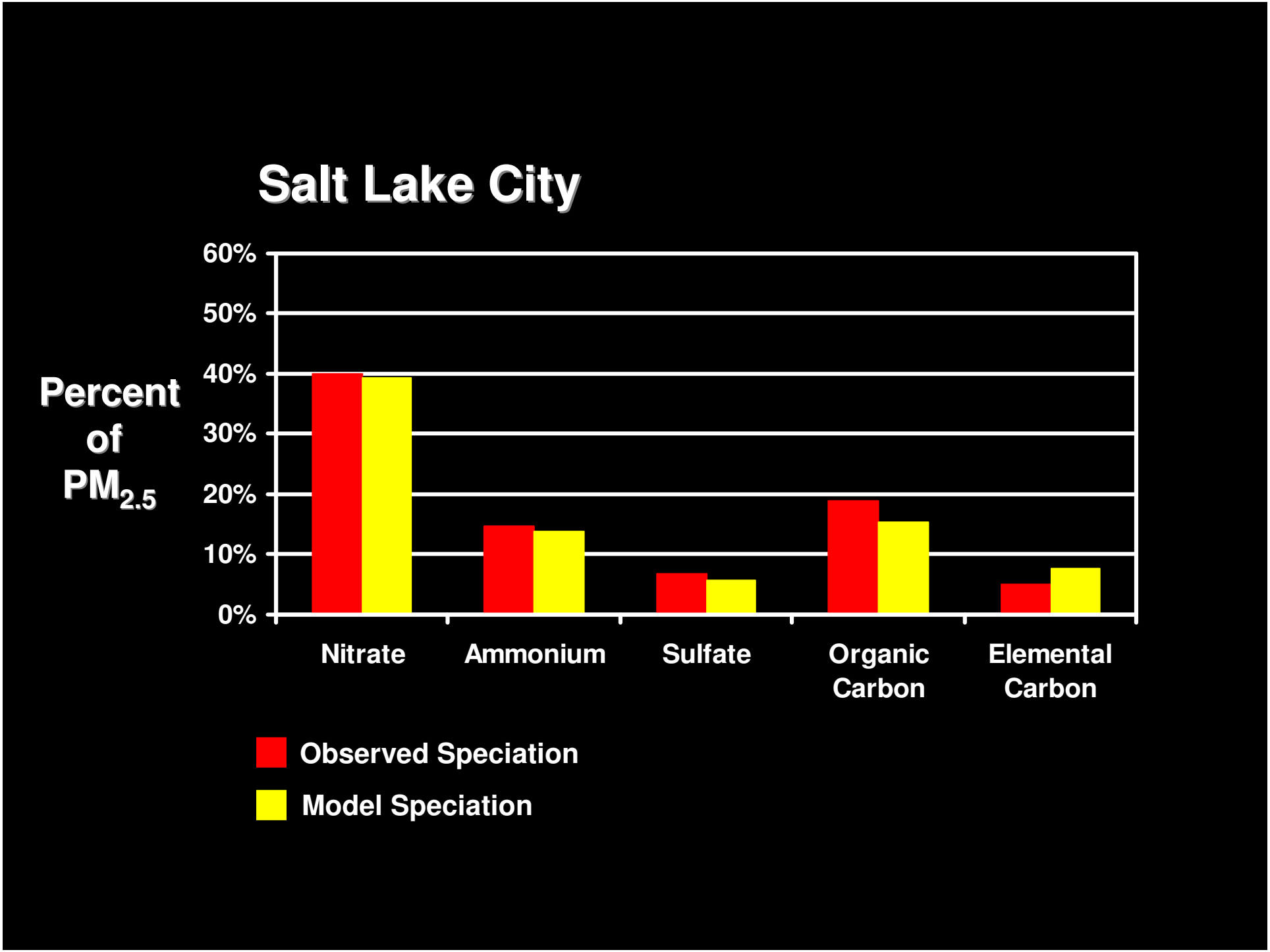

24-Hour PM2.5 (ug/m3)
70
60
50
40
30
20
10
0
Dec 13
Dec 16
Dec 19
Dec 22
Dec 25
Dec 28
Dec 31
Jan 03
Jan 06
Jan 09
Observed 24-Hour Average PM2.5
Modeled 24-Hour Average PM2.5


Tooele
24-Hour Average PM2.5 (ug/m3)
70
60
50
40
30
20
10
0
Dec 13
Dec 16
Dec 19
Dec 22
Dec 25
Dec 28
Dec 31
Jan 03
Jan 06
Jan 09
Observed 24-Hour Average PM2.5
Modeled 24-Hour Average PM2.5

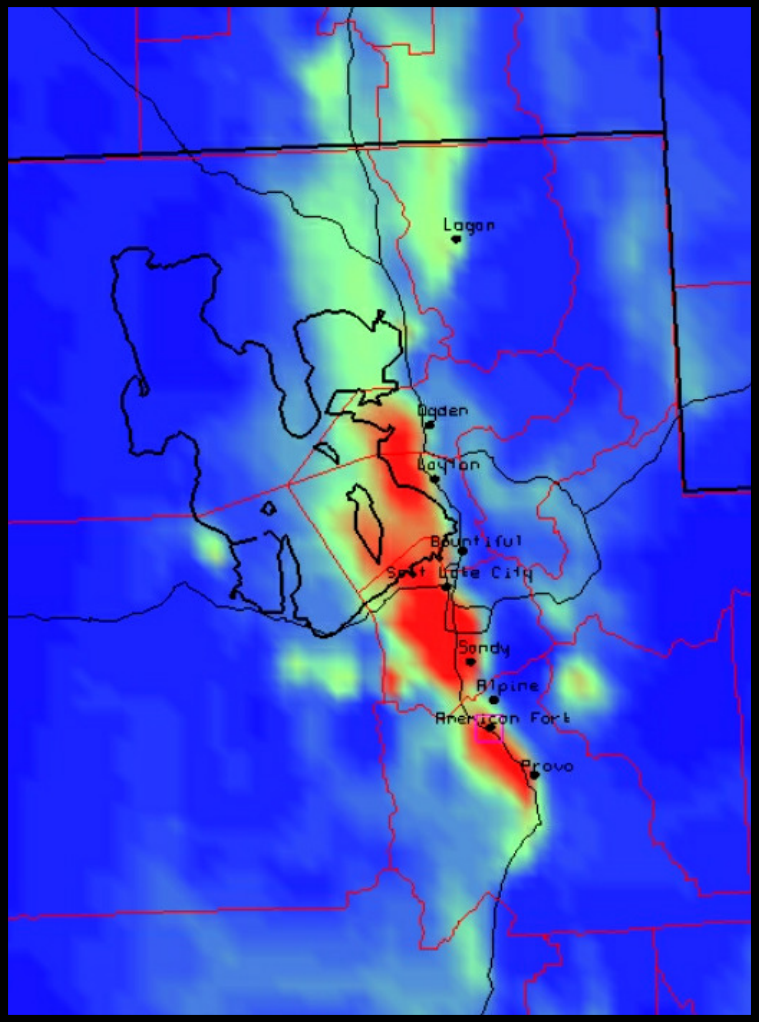
Salt Lake City




Lindon
Percent of $PM_{2.5}$
60%
50%
40%
30%
20%
10%
0%
Nitrate
Ammonium
Sulfate
Organic Carbon
Elemental Carbon
Observed Speciation
Model Speciation


Salt Lake City
Percent of $PM_{2.5}$
60%
50%
40%
30%
20%
10%
0%
Nitrate
Ammonium
Sulfate
Organic Carbon
Elemental Carbon
Observed Speciation
Model Speciation

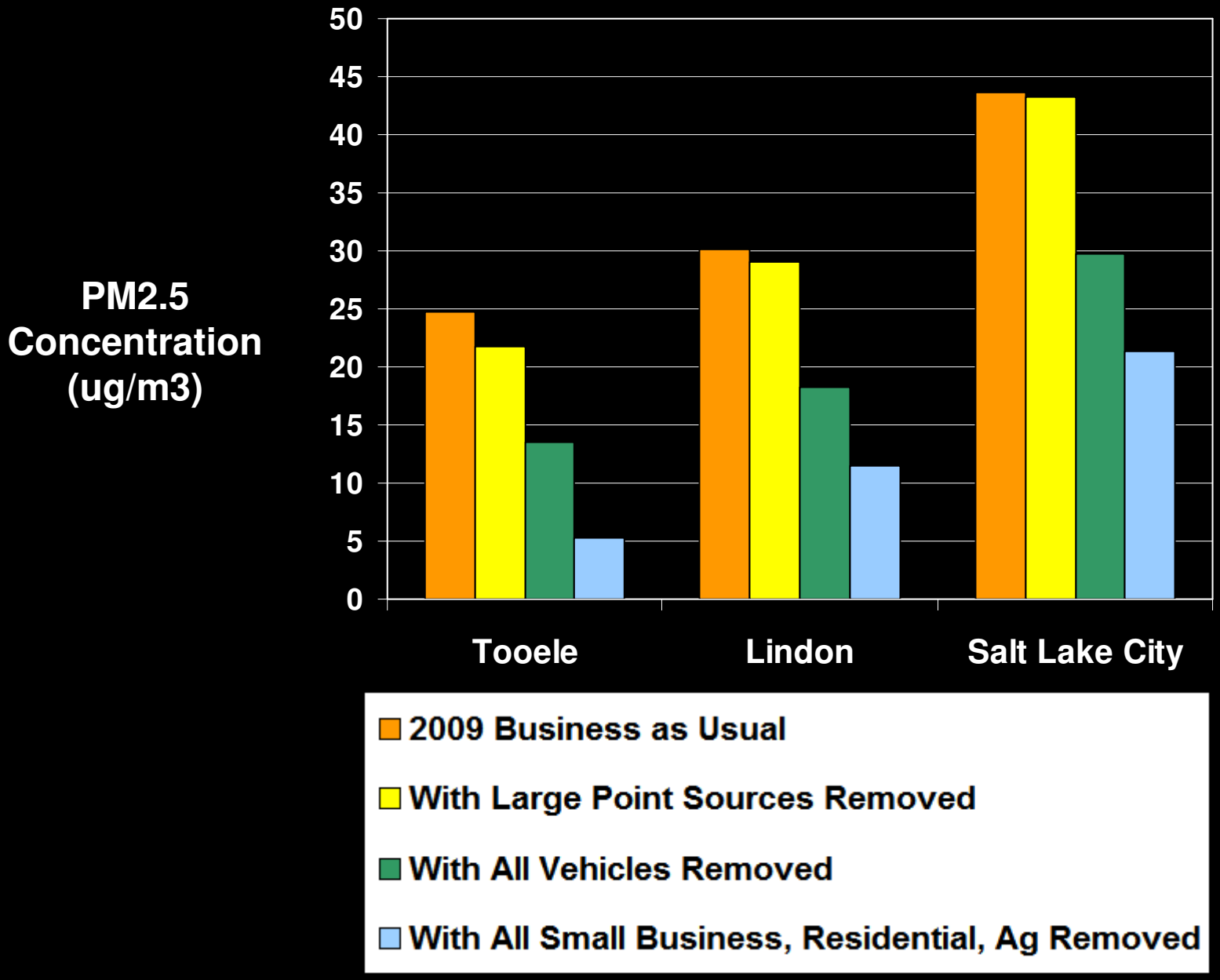
Model Implications

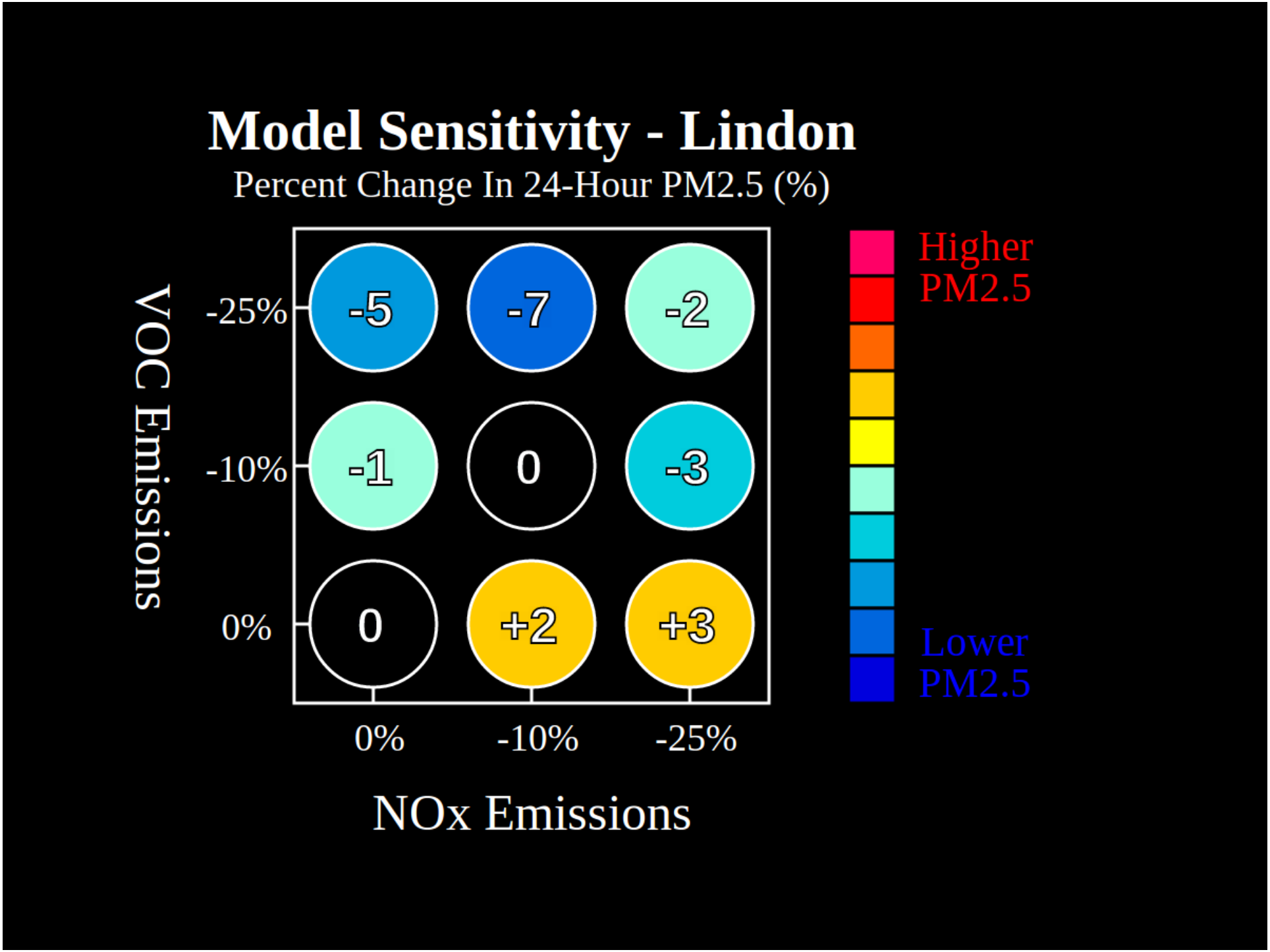


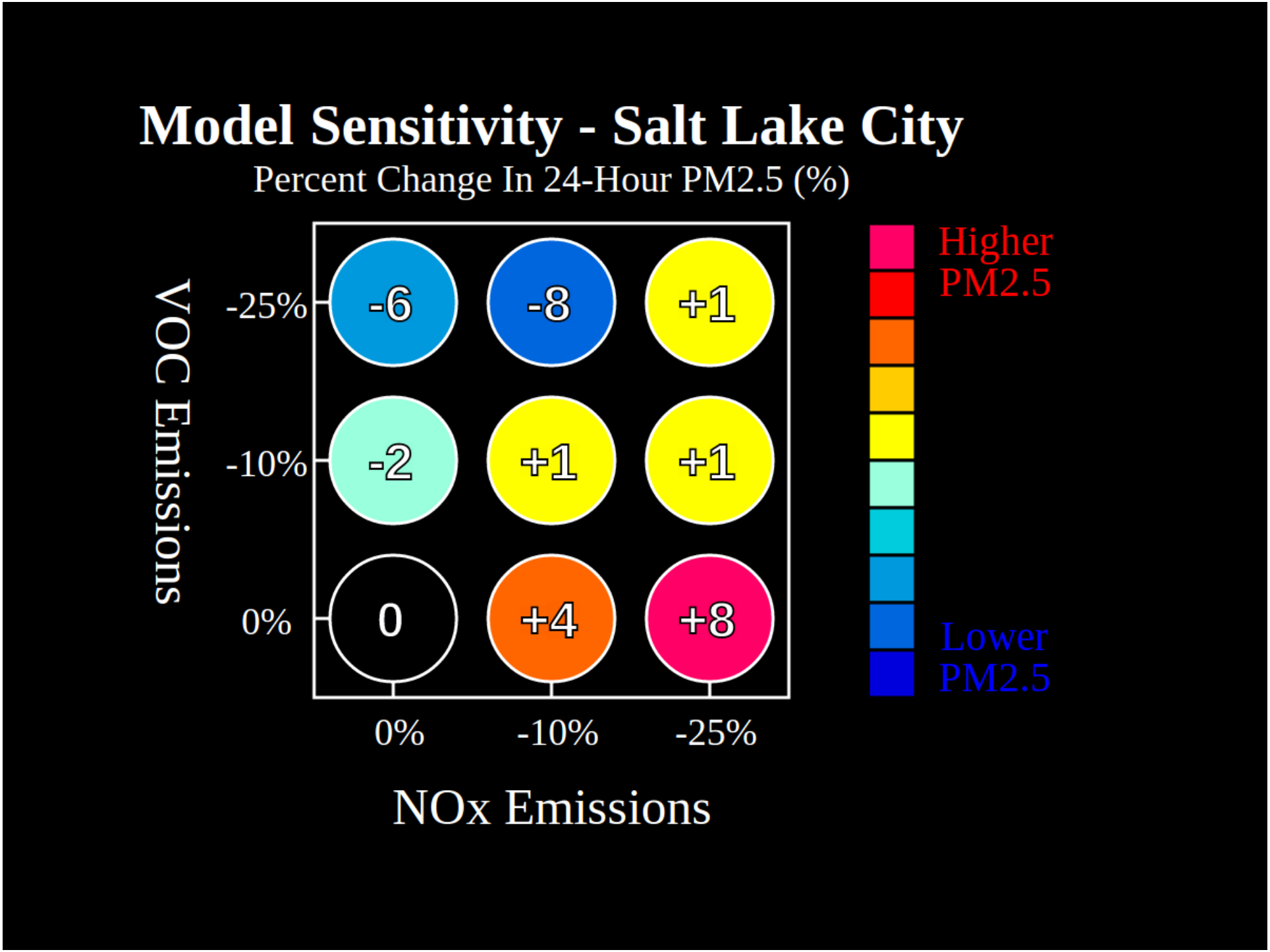
Who ?

What ?

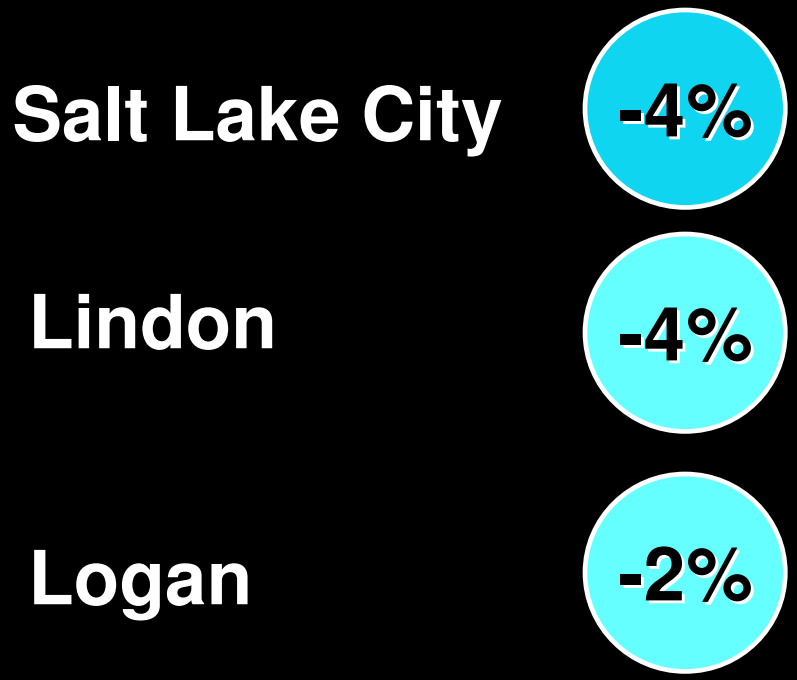
Modeled PM2.5 Concentrations




Model Sensitivity - Lindon
Percent Change In 24-Hour PM2.5 (%)
VOC Emissions
-25%
-10%
0%
-5
-7
-2
-1
0
-3
0
+2
+3
0%
-10%
-25%
NOx Emissions
Higher PM2.5
Lower PM2.5


Model Sensitivity - Salt Lake City
Percent Change In 24-Hour PM2.5 (%)
VOC Emissions
-25%
-10%
0%
-6
-8
+1
-2
+1
+1
0
+4
+8
0%
-10%
-25%
NOx Emissions
Higher PM2.5
Lower PM2.5

25% Reduction of Organic Carbon



Change in 24-Hour Average PM2.5 (ug/m3)

Take Aways

- Area, Mobile
- VOC
- Complex Secondary Chemistry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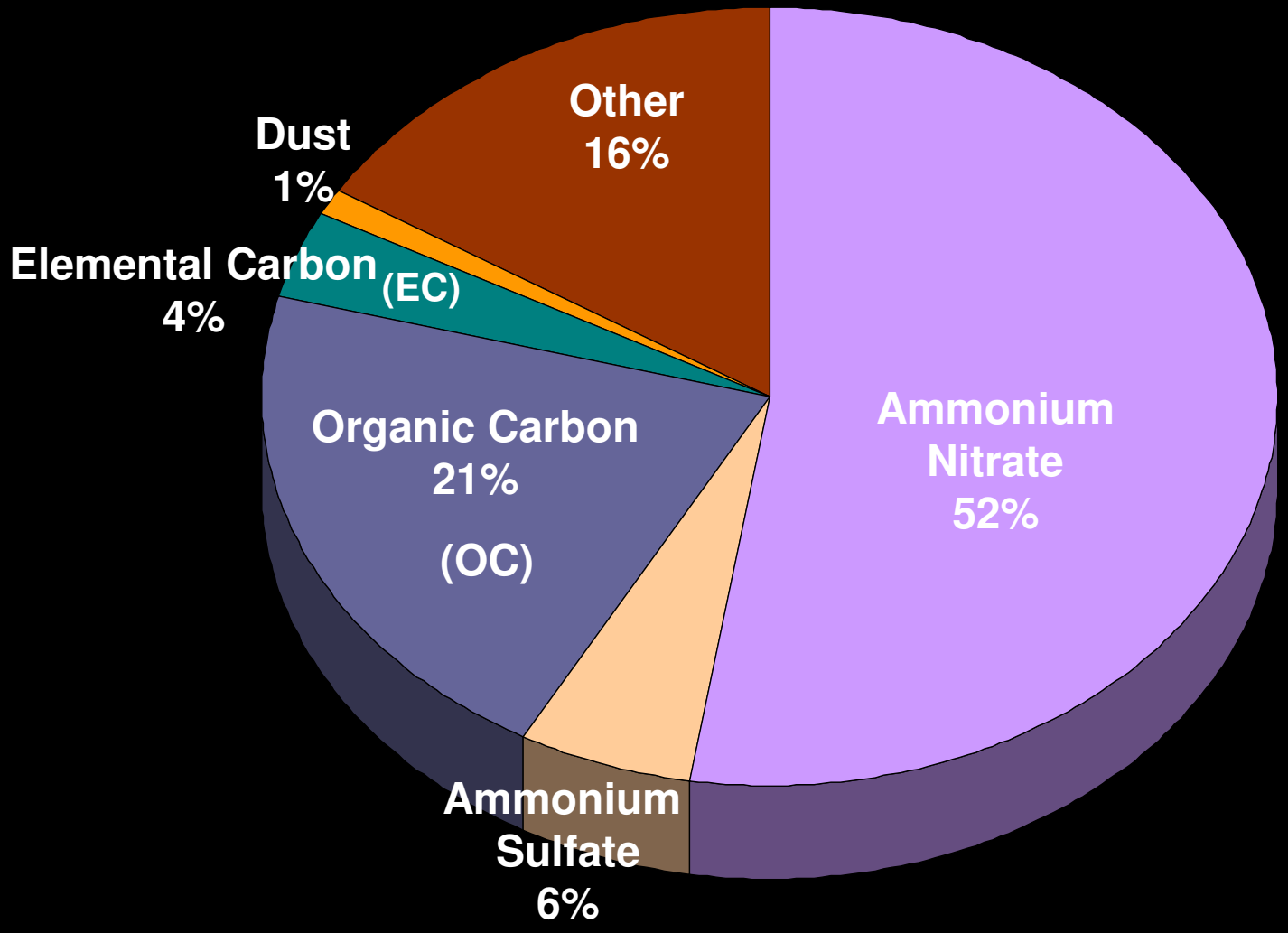
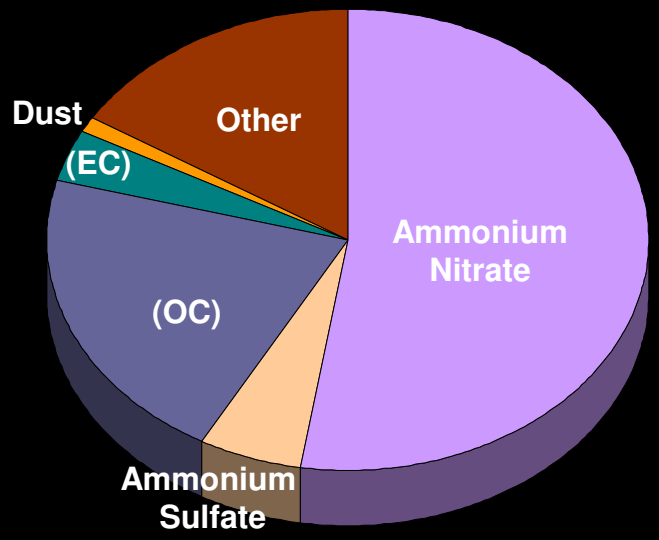
The Emissions Inventory
Utah County
Typical Winter Inversion Day
January 6, 2010

Lindon Monitor

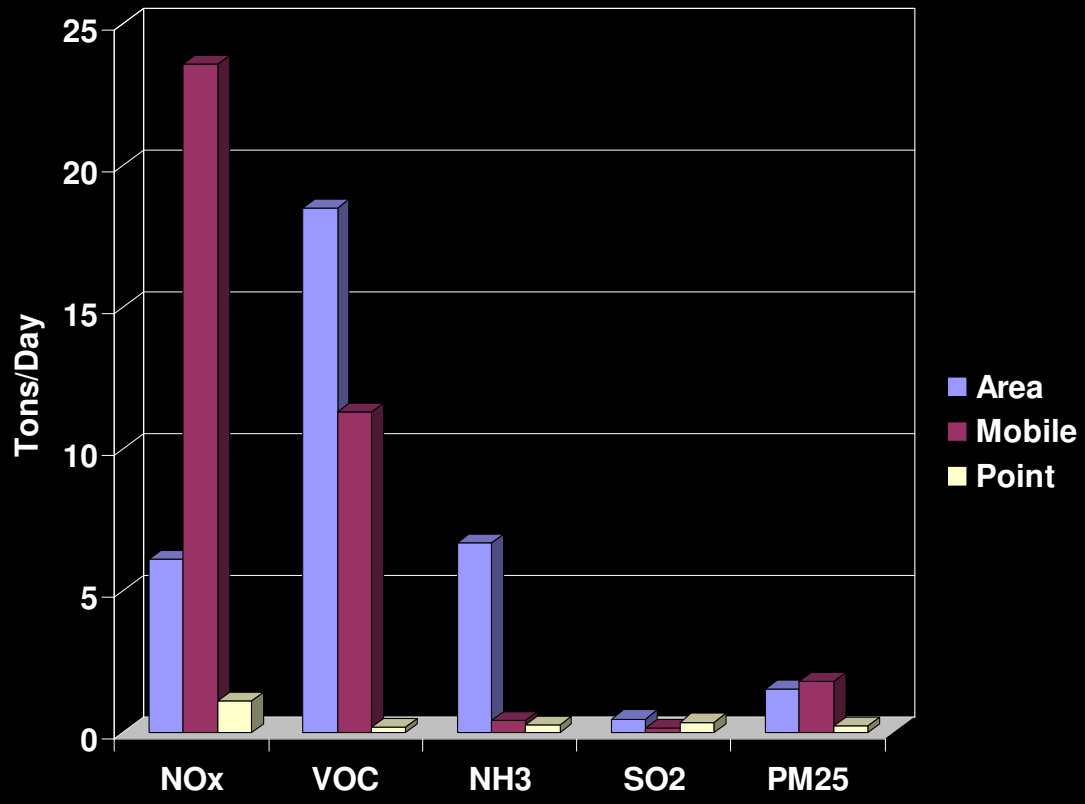


Total $PM_{2.5}$

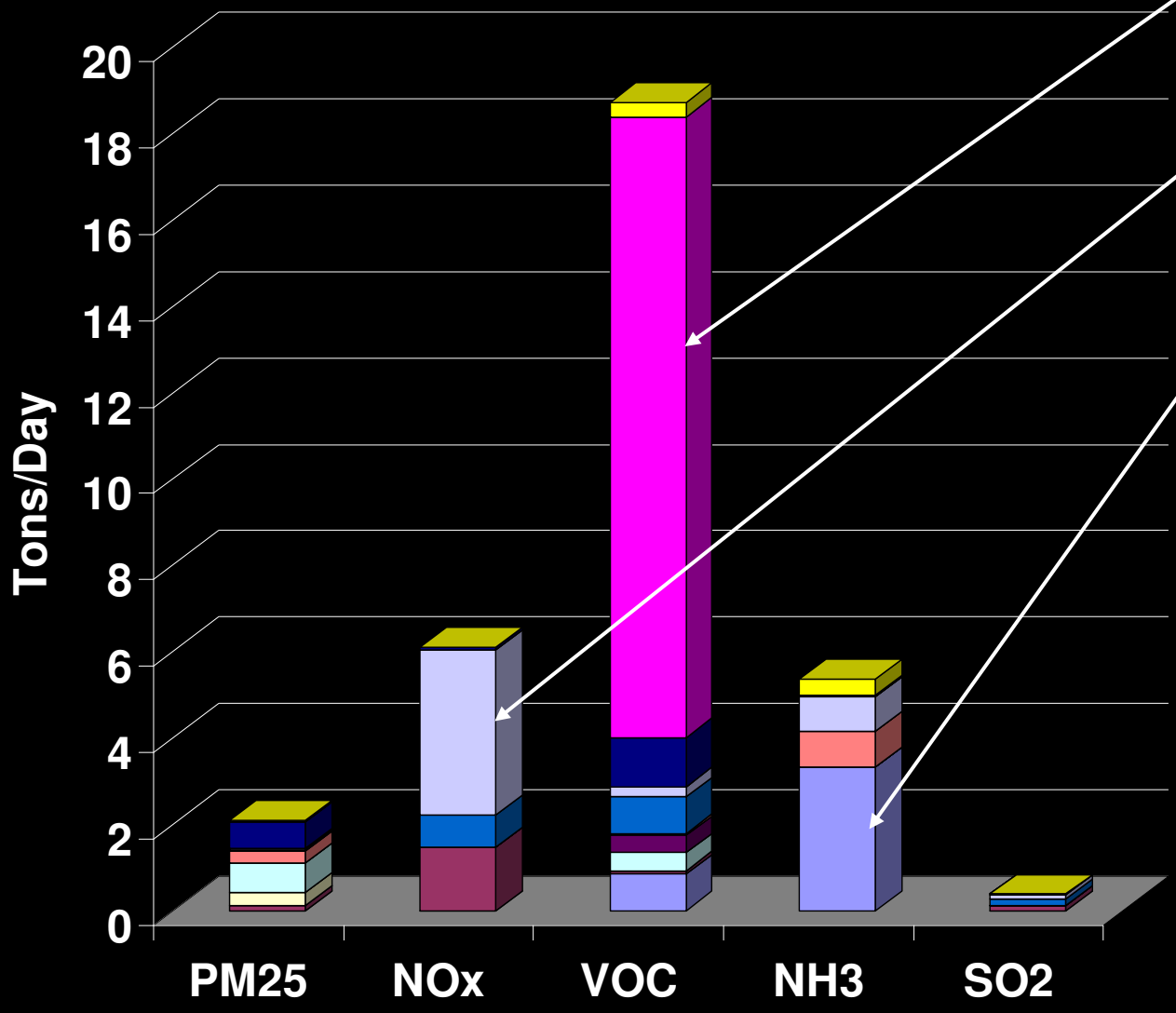


Chemistry
Atmospheric Dynamics

Utah County Daily Emissions



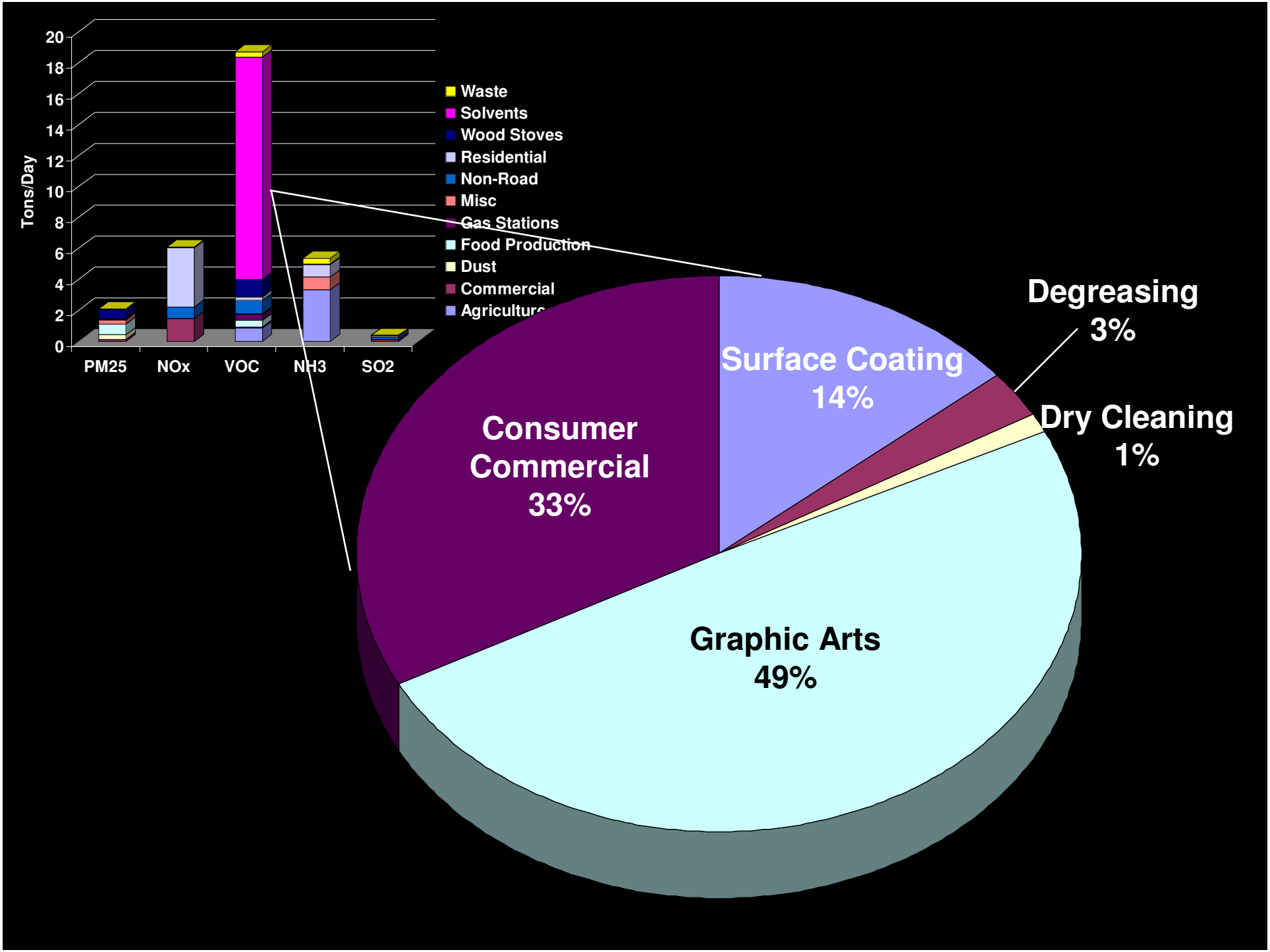
Area Source Emissions

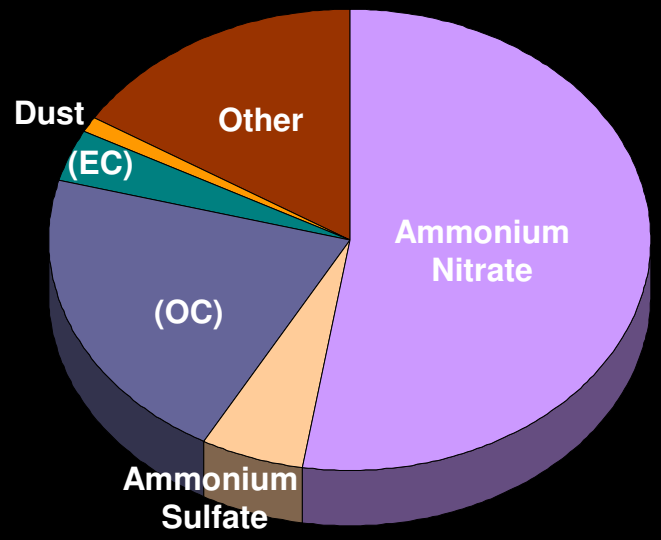


Solvents

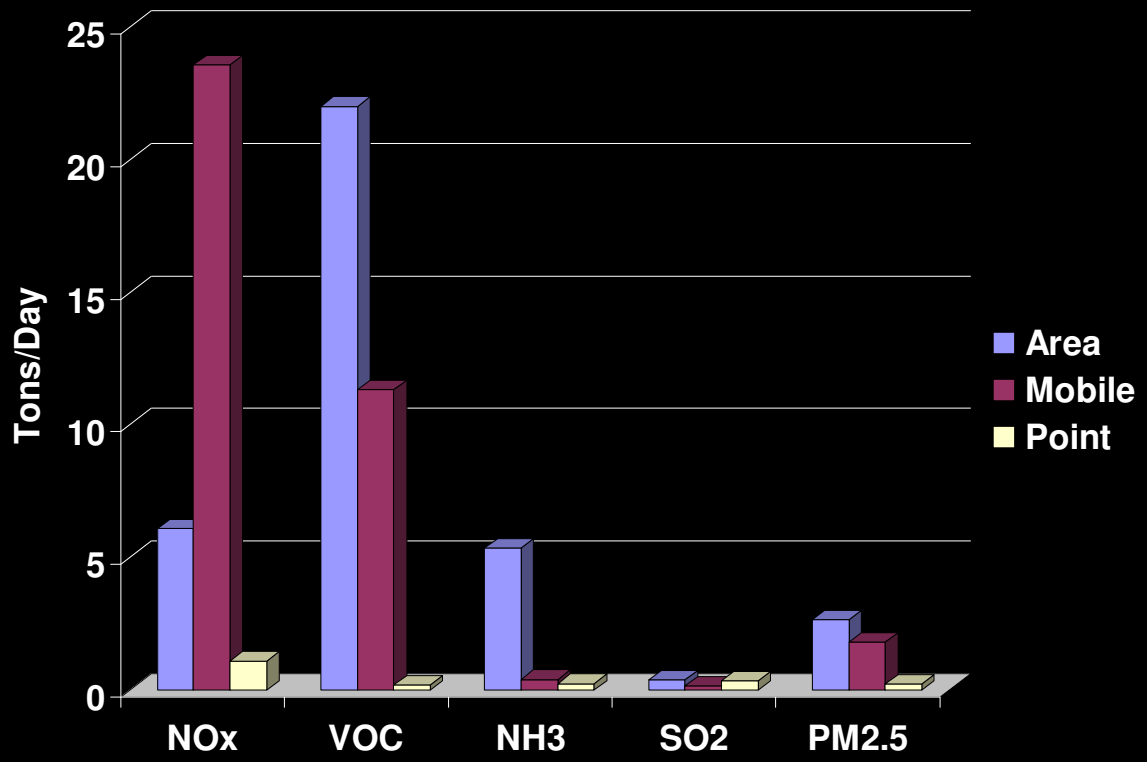
Residential Heat

Agriculture

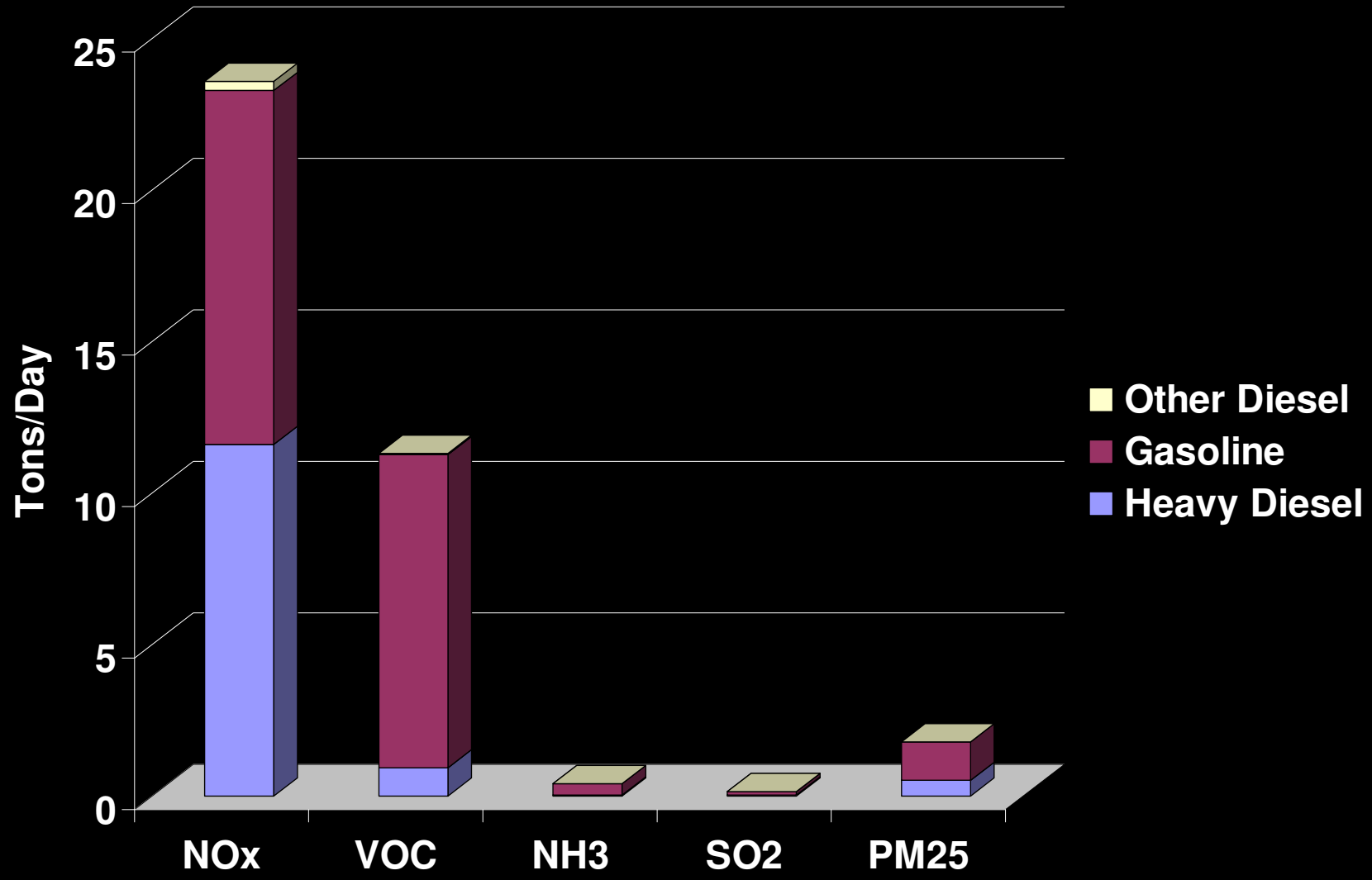

20
18
16
14
12
10
8
6
4
2
0
Tons/Day
PM25
NOx
VOC
NH3
SO2
Waste
Solvents
Wood Stoves
Residential
Non-Road
Misc
Gas Stations
Food Production
Dust
Commercial
Agricultur
Surface Coating
14%
Degreasing
3%
Dry Cleaning
1%
Consumer
Commercial
33%
Graphic Arts
49%

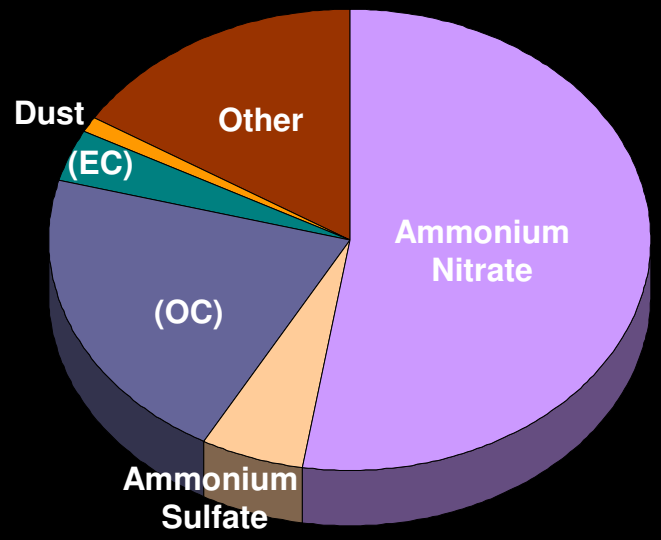


Mobile Source

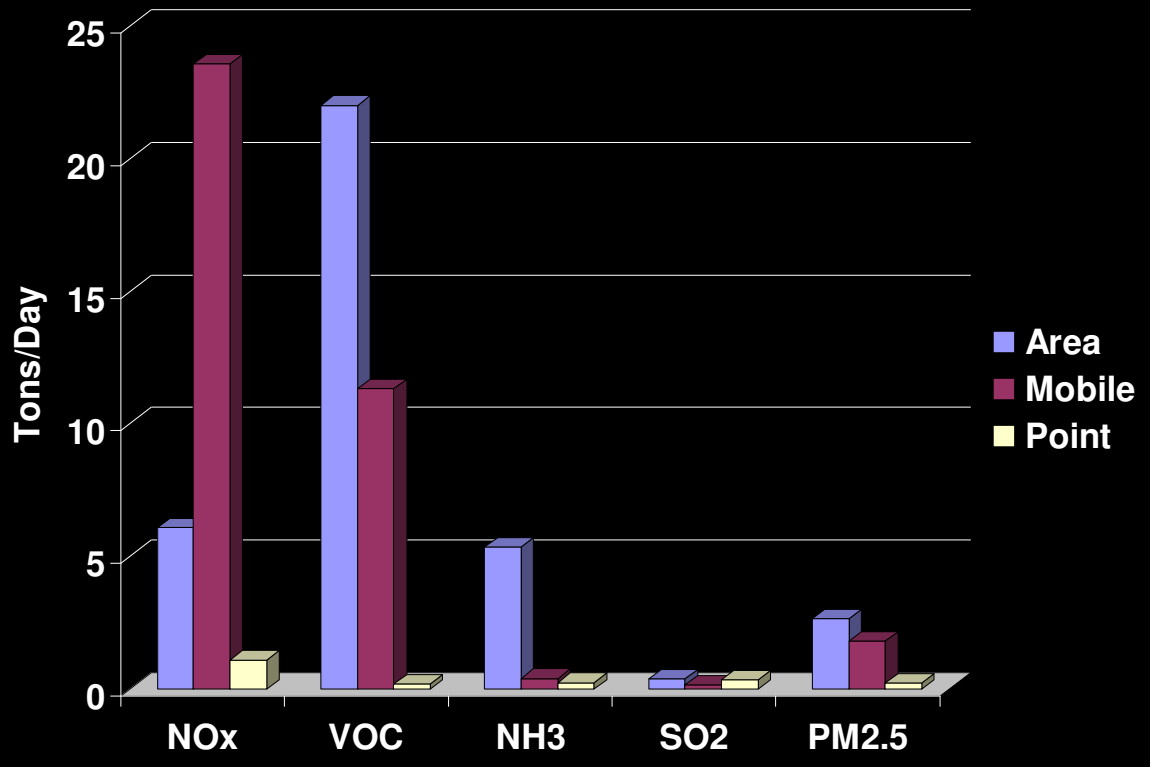


Autos, Heavy and Light Duty Diesel

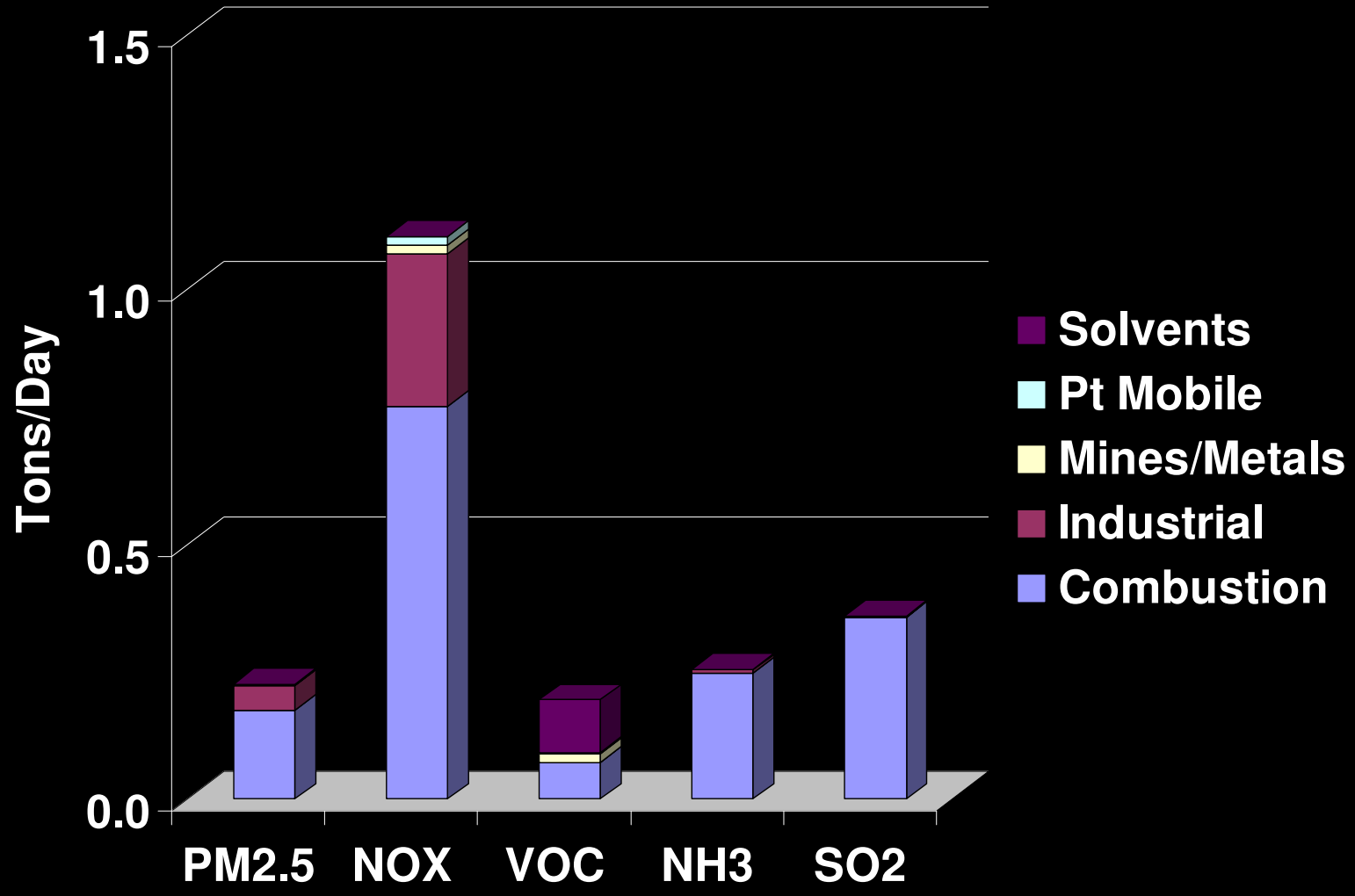




Point Source



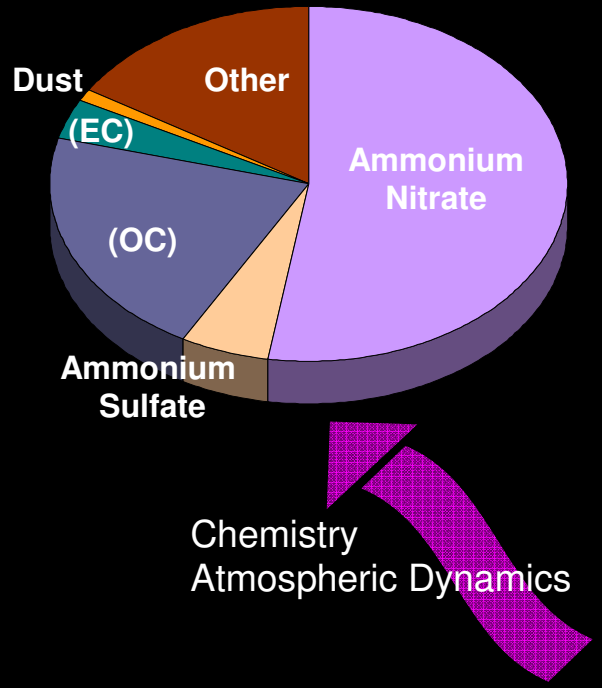
Large Industrial Sources

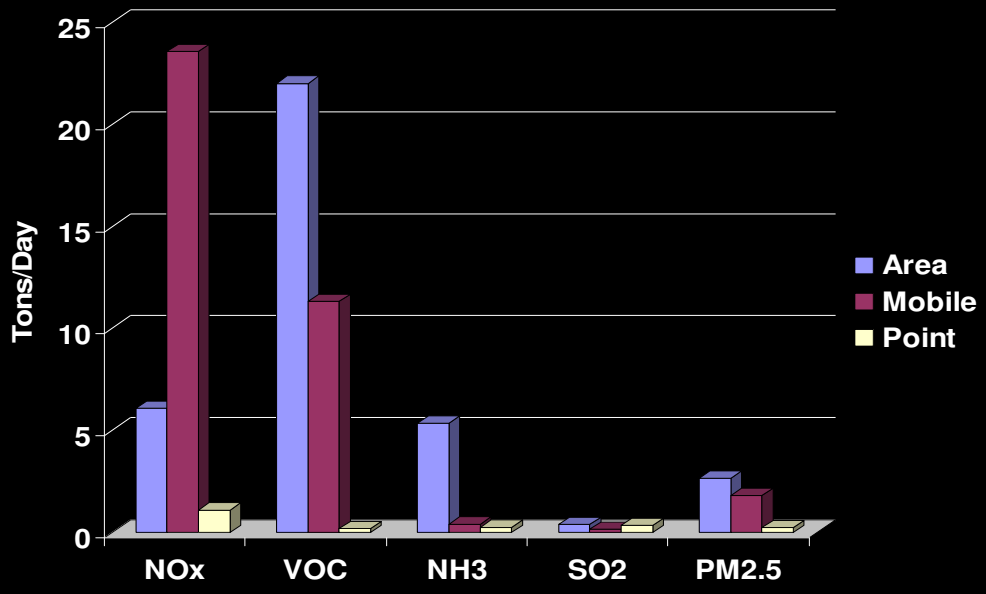


In Conclusion

1. Types of Emissions

- Highest emission levels – not necessarily most appropriate target
- Match Pollutant To PM Species

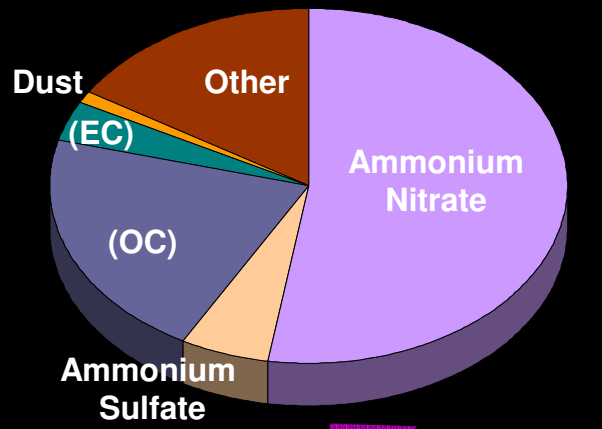




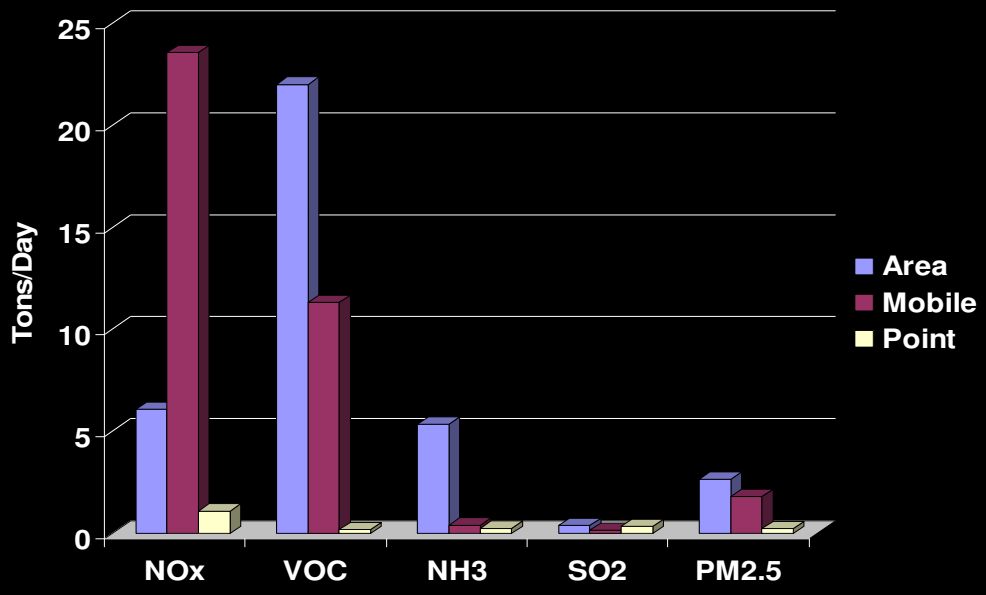
In Conclusion

2. Emissions Analysis Combined With the Air Quality Model

- Provides Insight and Guidance On Control Strategy Effectiveness



Chemistry
Atmospheric Dynamics

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RACT / RACM

- Reasonably Available Control…
  - Measures (any source category; point / area / mobile)
  - Technology (point sources only / therefore, a subset of RACM)
- EPA's Rulemakings for PM2.5 RACM
  - Fine Particulate Implementation Rule (handout to summarize)
  - 40 CFR 51.1010
- 3 Steps to Our Job
  - Identify Options that are Feasible
  - Quantify and Test
  - Select

Control Strategies: Issues to Consider

- Will also apply to the precursors that form PM2.5
- Will consider all Source Categories in the airshed
  - Large Point Sources will be evaluated for Reasonably Available Control Technology (RACT)
  - Controls on Area Sources such as wood burning and minor source categories will be considered
  - Mobile Sources will be evaluated for various strategies (including on-board diagnostics (OBD), I/M, and strategies to reduce vmt)
- Must Adopt all Measures Necessary to:
  - meet the health standard as expeditiously as practicable
  - Meet any Reasonable Further Progress (RFP) requirements


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Air Quality

Emissions Reduction: Ideal

Emissions Reduction: Reality

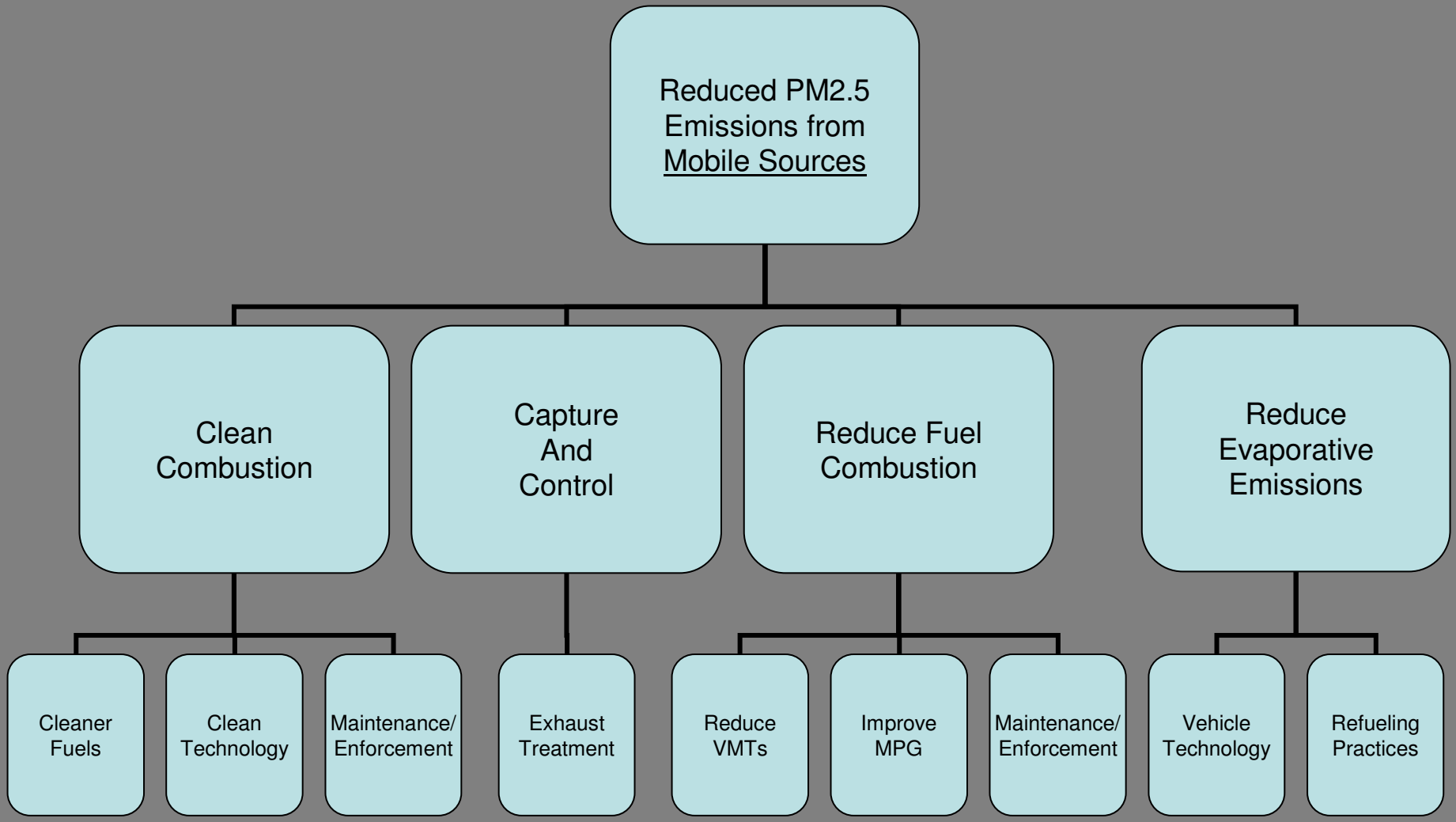
Emissions Reduction Pathway

Emissions Reduction Pathway: Mobile Source Example

Reduced PM2.5 Emissions from Mobile Sources

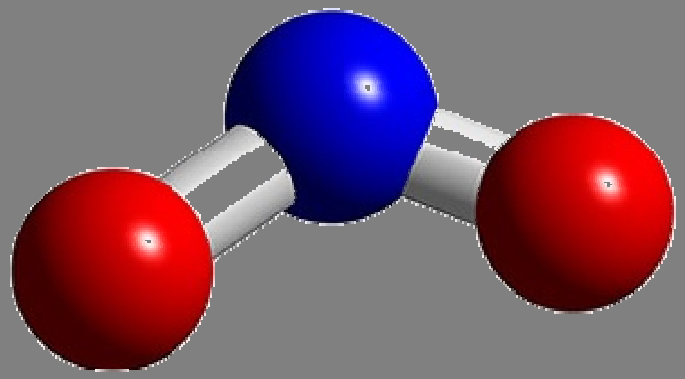
- Clean Combustion
- Capture And Control
- Reduce Fuel Combustion
- Reduce Evaporative Emissions

Emissions Reduction Pathway: Mobile Sources

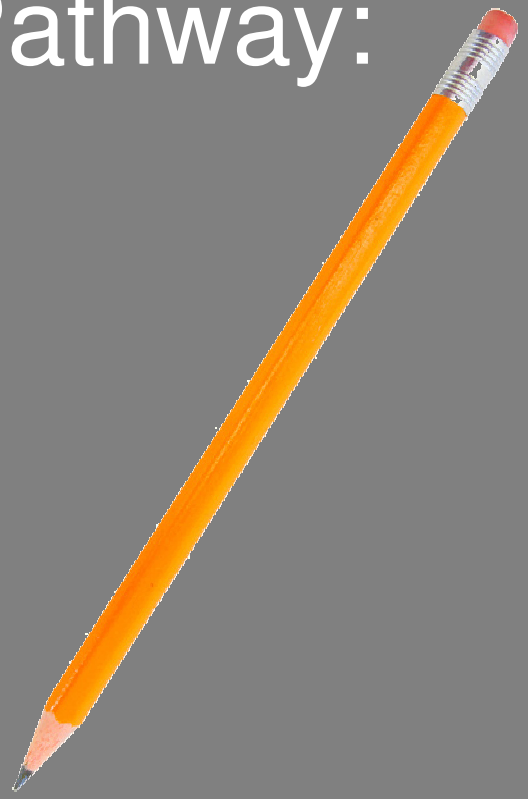


Emissions Reduction Pathway: Targeted Pollutant(s)

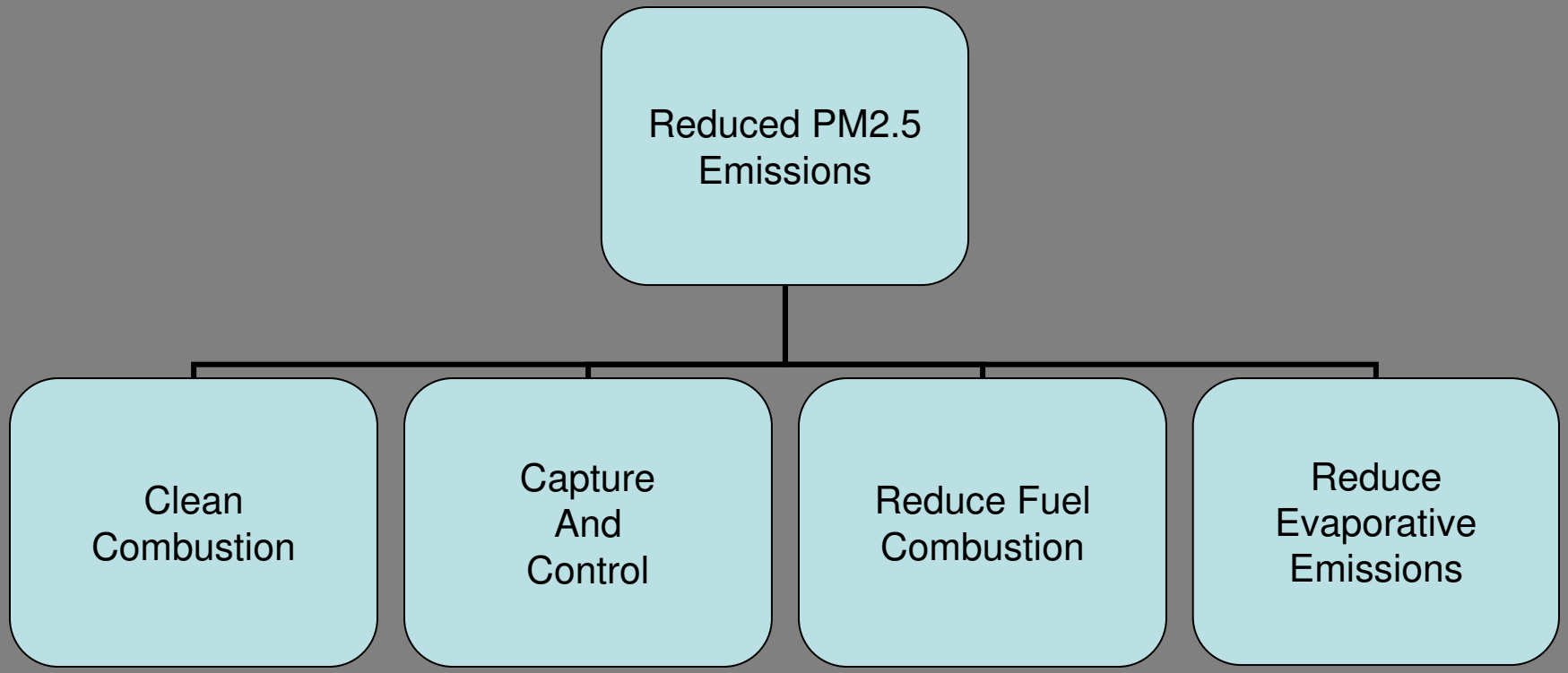
- Does the control strategy address primary or secondary PM 2.5?
- If secondary, what precursor does the strategy target?
  - NOx
  - VOCs



Emissions Reduction Pathway: Exercise



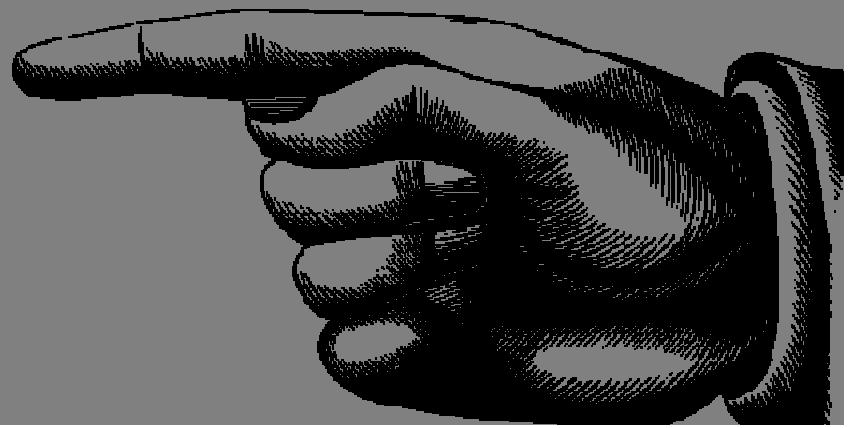
How does each strategy impact emissions?



- Diesel oxidation catalyst (DOC)
- Cleaner burning fuels
- Reducing car use through enhanced transit
- IM program

Responsibility for Implementation

- Party (or parties) responsible for implementation?
- Related issues:
  - Authority to implement?
  - How will the measure be funded?
  - Winners and losers?



Relative Air Quality Benefits

- What is the relative impact of the control measure on air quality?
  - Quantifiable?
  - Enforceable?
  - Durable?

Timing

- When will the air quality benefits occur?
  - Immediate
  - Near-term
  - Medium-term
  - Long-term
- Soon enough to help achieve attainment status?
- Seasonal?

Relative Implementation Cost

- What are the costs of implementation?
  - Are there savings to help offset costs?
- Who bears the cost?
- At what level are costs to be assessed?
  - Individual/firm?
  - Government entity?
  - Economy-wide?

Political and Technical Feasibility

- Is there political support for/opposition to the measure?
  - Can support be built through outreach, information sharing, and collaboration?
- Are there technical hurdles that must be addressed before a successful outcome is assured?

End User Impacts

- How are impacts perceived by affected parties?
  - New costs/burdens?
  - New services, opportunities, or savings for end users?

Resources

- List of several potential control strategies across all emissions sources/sectors.
  - Not exhaustive
  - participants are encouraged to consider additional measures.
- Reference list with links to various sources of information on control strategies.


Utah
Department of Environmental Quality
Division of
Air Quality

Constituent Involvement

- Three key roles:
  - 1. WG members inform constituents
  - 2. WG members collect and forward constituent questions/ideas/information
  - 3. WG members help advocate for a successful SIP process among their constituents

Constituent Involvement

- Inform your constituency
  - Meet with those in your area of interest
  - Consider the control strategy menu and feasibility exercise in a constituent group
  - Help make constituents aware of education resources available for the process
  - Keep a list of those you know are interested and have involved themselves

Constituent Involvement

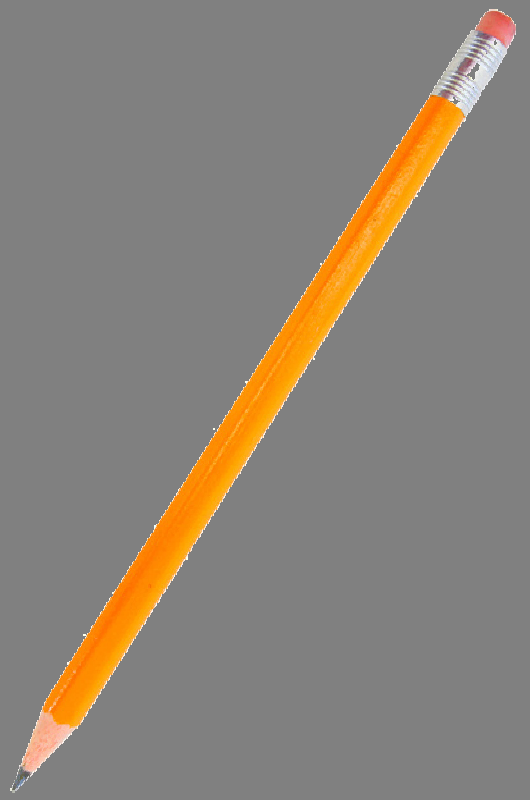
- Collect Questions/Ideas/Information
  - When constituents ask specific questions, please record and forward.
  - Make constituents aware that they can comment directly at www.govcomments.com, request that they provide their contact information when they add comments.
  - Let us know of anything important you learn.
  - Please respond to surveys and materials we send you in a reasonable timeframe.

Constituent Involvement

- Advocate for a Successful SIP Process
  - WG members are central to our process.
  - With so many challenges, we need a process that works.
  - WG members, regardless of their own interests and positions, can advocate for a successful outcome and pass that goal on to constituents.

Assignments:

- Consider strategies and rank for feasibility with your constituents.
  - Submit top 5 to DAQ
- Fill out forthcoming Survey within 1 week.
- Carefully read information updates we send you
- Prepare for Meeting 2
  - DAQ will provide web updates, meeting summaries, surveys, schedules updates, and custom information as requested.



Control Strategy Exercise

Control Measure	Source Type	Pathway and Targeted Pollutant	Responsibility for Implementation (list party or parties)	AQ Benefit (Low-Med-High)	Economic Feasibility	Technical Feasibility	Schedule Feasibility	Political Feasibility	End User Impacts (Low-Med-High)
Example: Diesel Retrofits	Mobile	Capture and Control	DAQ, EPA, firms, schools	Low to Med	3-4	4-5	2-3	5	Med

FEASIBILITY DEFINITIONS: Feasibility factors to consider are economic, technical, schedule, and political. Economic feasibility relates to identifying the financial benefits and costs associated with an approach to attainment (would the cost of implementation make the strategy infeasible?). Technical feasibility relates to UDAQ's ability to implement a proposed strategy (is it technically simple, challenging, or impossible to implement?) Schedule feasibility is whether the strategy can yield its benefits within the scheduled timeframe for achieving attainment. Political feasibility relates to whether the strategy can realistically be implemented given social and political constraints. For each of these, attempt to use a scale of 1-5 as follows:

1. Strategy Not Feasible
2. Strategy Hard to Implement
3. Strategy Moderately Difficult to Implement
4. Strategy Moderately Easy to Implement
5. Strategy Easy to Implement